ZX Platform Condensing Unit
Product Manual

Copeland™ brand products

EMERSON™ Climate Technologies

About Emerson Climate Technologies

Emerson Climate Technologies, a business segment of Emerson, is the world's leading provider of heating, air conditioning and refrigeration solutions for residential, industrial and commercial applications. The group combines best-in-class technology with proven engineering, design, distribution, educational and monitoring services to provide customized, integrated climate-control solutions for customers worldwide. Emerson Climate Technologies' innovative solutions, which include industry-leading brands such as Copeland Scroll and White-Rodgers, improve human comfort, safeguard food and protect the environment. For more information, visit EmersonClimate.com.

Emerson's financial performance is embellished with a record of unmissed annual dividend for 55 consecutive years.

For FY11, Emerson was ranked No. 120 on Fortune 500, a list of America's largest companies, and placed No. 1 in the same list's Electronics and Equipment category.

The company invested approximately $696 million in engineering, development and customer solutions development producing 773 patents worlwide from FY04 to FY10.

In 2010, 37% of the company's global sales from new products are due to the application of innovative technologies.

Emerson Climate Technologies is pleased to offer the ZX platform refrigeration condensing units (CDU) specifically designed for medium temperature (ZX-MT), digital modulated variable capacity medium temperature (ZXD) and low temperature (ZXL-LT) refrigeration.

ZX series CDU has been highly successful in the Asian market and enjoys proven success with its energy savings and customer-friendly electronic features.

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ZX Platform Condensing Unit was designed based on three factors demanded by industry users:

Energy Efficiency - Utilizing Copeland Scroll® compressor technology, variable speed fan motor, large capacity condenser coil and advanced control algorithms, energy consumption is significantly reduced. End-users can save more than 20% on annual energy costs rather than using hermetic reciprocating units.

Reliability - Combining the proven reliability of Copeland Scroll® compressors with advanced electronics controller and diagnostics, equipment reliability is greatly enhanced. Fault code alerts and fault code retrieval capabilities provide information to help improve speed and accuracy of system diagnostics. Integrated electronics provide protection against over-current, over-heating, incorrect phase rotation, compressor cycling, high pressure resets, low pressure cut-outs. It can also send out a warning message to an operator when there is a liquid floodback, which can prevent critical damage on the unit.

Flexibility - The slim shape and light weight make the ZX Condensing Unit aesthetically appealing and easy to install. The ultra quiet variable-speed fan motor significantly reduces exterior sound levels, allowing additional location flexibility. Combined with wall mounting capability, the ZX Condensing Unit delivers unmatched flexibility.

ZX Condensing Units are greatly suitable for walk-in cooler and freezer applications.

The advance scroll compressor technology, fan speed control and electronic controller are precisely collaborated in all units. It also introduces variable-speed fan motors that go beyond national standards. Guaranteed dependable performance and operation in food service applications while conveying higher energy efficiency and lower sound levels are the main objectives.

ZX – Design Platform

The ZX platform CDUs are designed to provide the best operational cost savings on a year around basis. Refrigeration equipment operate continuously for7 days, 24 hours and 365 days. The ZX and ZXI compressors, injection scheme and heat exchanger designs are optimized to provide best efficiencies at annual averaged temperature rather than at typical rating conditions. The typical ambient on an annual basis follows a normal distribution pattern. The highest and lowest ambient happens only for few hours as shown in figure 01.

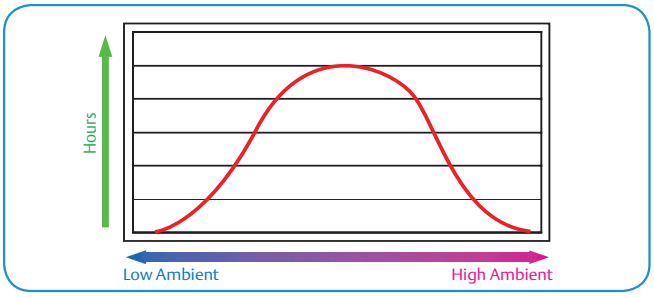


Figure 01. Shows Annual Typical Ambient Pattern

ZX – Reliability Platform

Emerson Climate Technologies has designed the ZX platform CDUs with extended operational capability in tough climatic conditions. With our vast experience in the refrigeration industry, ZX platform CDU is designed with a good protection scheme. ZX protection scheme detect conditions that could cause damage to the compressor, initiates a warning, temporary shutdown and auto restarts. The control system will allow a complete shutdown requiring manual restart only after several iterations of repeated warnings and temporary shutdowns are carried out. The control system is driven by the built-in "E2 Controller". Figure 02 shows the control strategy of the E2 Controller in a schematic form.

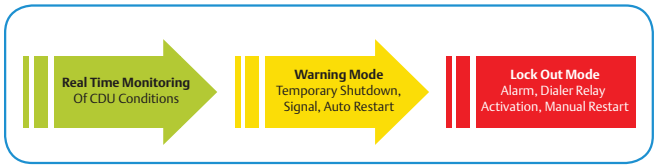


Figure 02. Control Strategy of the E2 Controller

ZX – Performance Platform

Emerson Climate technologies with its leadership in scroll compression technology, apply the most advanced techniques to maximize the possible operational efficiency at specific application envelopes. ZX MT CDU applies a patented suction-line injection technology. Scroll compressor inherently operates at higher efficiency at MT application conditions. The suction-line injection provides a more reliable MT operating envelope.

ZX MT CDU applies ZX series scroll compressor with liquid injection into the suction-line using an electronic expansion valve (EXV). The EXV maintains an optimum feed of partially vaporized liquid refrigerant in the compressor suction to maintain a safe discharge gas temperature. The controlled discharge gas temperature provides a more reliable solution for the MT envelope.

ZXL LT CDU applies vapor injection technology to achieve higher efficiency in LT refrigeration. Vapor injection allows an economizer cycle to be applied on a scroll compressor thereby greatly enhancing compressor efficiency. This technology can be likened to 2- stage compression with economizer cycle. Vapor injection improves efficiency by as much as 12% over a liquid injection system of the same type. ZXL LT CDU applies ZXI series vapor injected compressor with vapor injection plate heat exchanger (PHE) to implement the vapor injection technology.

Diagnostic Protection	Increased Reliability and Lower Maintenance Costs
Flexibility	More Installation Options
Highest Efficiency	Lower Energy Bills

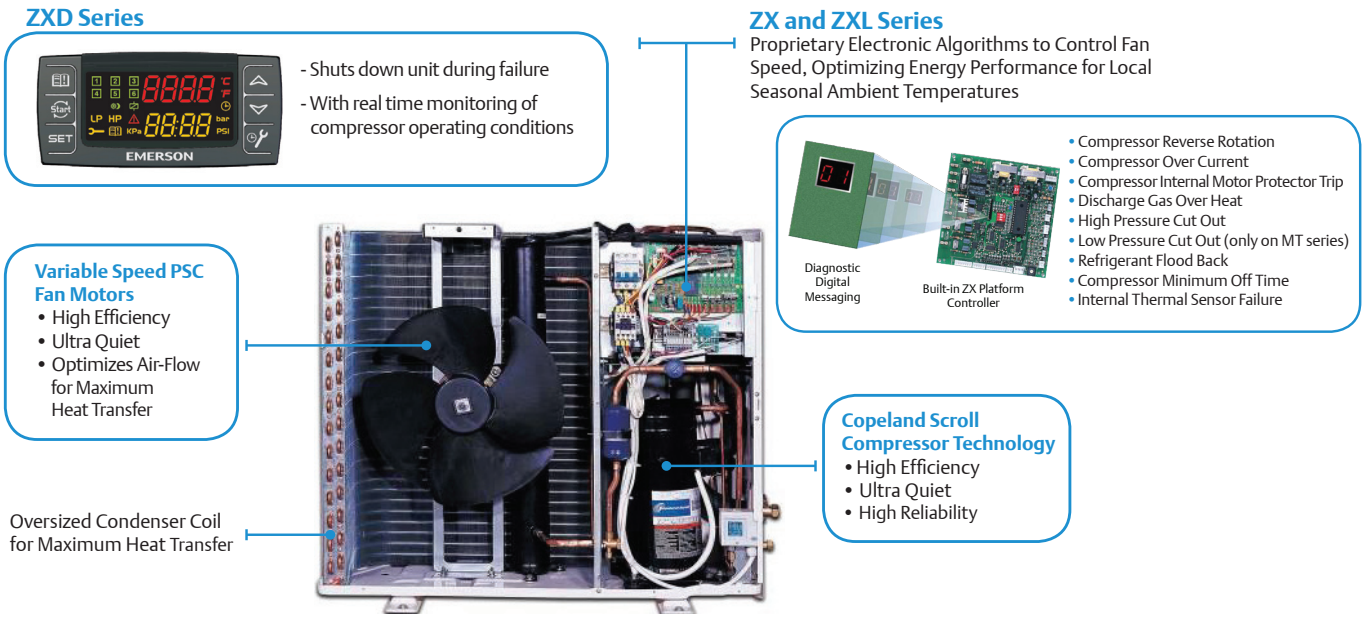

ZXD Series
- Shuts down unit during failure
- With real time monitoring of compressor operating conditions
EMERSON
ZX and ZXL Series
Proprietary Electronic Algorithms to Control Fan Speed, Optimizing Energy Performance for Local Seasonal Ambient Temperatures
Diagnostic Digital Messaging
Built-in ZX Platform Controller
• Compressor Reverse Rotation
• Compressor Over Current
• Compressor Internal Motor Protector Trip
• Discharge Gas Over Heat
• High Pressure Cut Out
• Low Pressure Cut Out (only on MT series)
• Refrigerant Flood Back
• Compressor Minimum Off Time
• Internal Thermal Sensor Failure
Variable Speed PSC Fan Motors
• High Efficiency
• Ultra Quiet
• Optimizes Air-Flow for Maximum Heat Transfer
Copeland Scroll Compressor Technology
• High Efficiency
• Ultra Quiet
• High Reliability
Oversized Condenser Coil for Maximum Heat Transfer

Figure 03. ZX Platform CDU Features

Standard Unit Features

- Pre-painted enclosures for corrosion protection.
- Heavy duty steel base with 23 mm raised legs.
- Brass service valves located externally for easy access.
- Raised electrical access panel for easier serviceability.
- Receivers with fusible plug, liquid shut-off valve and charging port.
- Easy to read moisture indicator.
- Variable-speed PSC fan motors.
- Advanced performance alert diagnostics.
- Over-sized condenser coils with additional fin corrosion protection for coastal zones.
- Light weight, slim-line profile for maneuverability and ease of installation.
- All units are factory tested for braze joint leaks, wiring connections, electrical continuity and start-up performance.
- Oil separator and accumulator standard on low temperature models.
- Operating ambient is 48°C to -23°C*.

Features	Owner/Enterprise Benefit
Energy improvement (More than $350 per year)	• Lower operating costs
Sound improvement	• Creating a more comfortable environment for guests • Beneficial for regions with noise ordinances
Diagnostic protection capabilities	• Reduces cost of nuisance calls • Extends life of your equipment • Reduces potential service costs • Maintains your equipment to original standards, maintaining energy efficiency and temperature control • Have confidence in what your contractor is fixing
Slim profile, lighter weight, and optional wall mount capability	• Lower installation costs • Improved appearance of your enterprise site • Avoids more costly solutions for potential location issues

*For applications outside these guidelines, please contact Application Engineering.

ZX Platform – Scroll Superiority

Scroll compressors deliver flatter capacity compared to reciprocating compressor condensing units due to the high volumetric efficiency of scroll compressors. Flatter capacity can otherwise be described as lower change in capacity with change in outdoor ambient. This is schematically shown in Figure 03. Flatter capacity brings certain inherent advantages, which highly benefit users and stored products.

Some of the benefits of flatter capacity on ZX platform CDUs are described below.

1. **Smaller unit selection:** Condensing units are selected to match the required refrigeration capacity at the highest required ambient. Flatter capacity allows a smaller unit selection compared to reciprocating compressor CDU.
2. **Lower operating cost:** At lower ambient conditions, ZX platform CDU delivers capacity closer to the cooling load. In contrast, reciprocating compressor CDU delivers capacity in far excess of what is required. This helps the ZX platform CDU to operate at relatively higher evaporating temperature. Higher evaporating temperatures improve compressor efficiency. In addition, higher evaporating temperature reduces the rate of ice formation on the evaporator coils/frost build-up. Lower frost build-up improves the evaporator heat exchange efficiency. It also reduces the defrost heat demand, thereby resulting in lower energy needed for defrost.
3. **Freshness of food:** Another benefit of higher evaporating temperature is reduced dehumidification by the evaporator coil. This allows higher relative humidity in cold room or cold cases. Higher relative humidity reduces weight shrinkage and improves freshness of stored product.

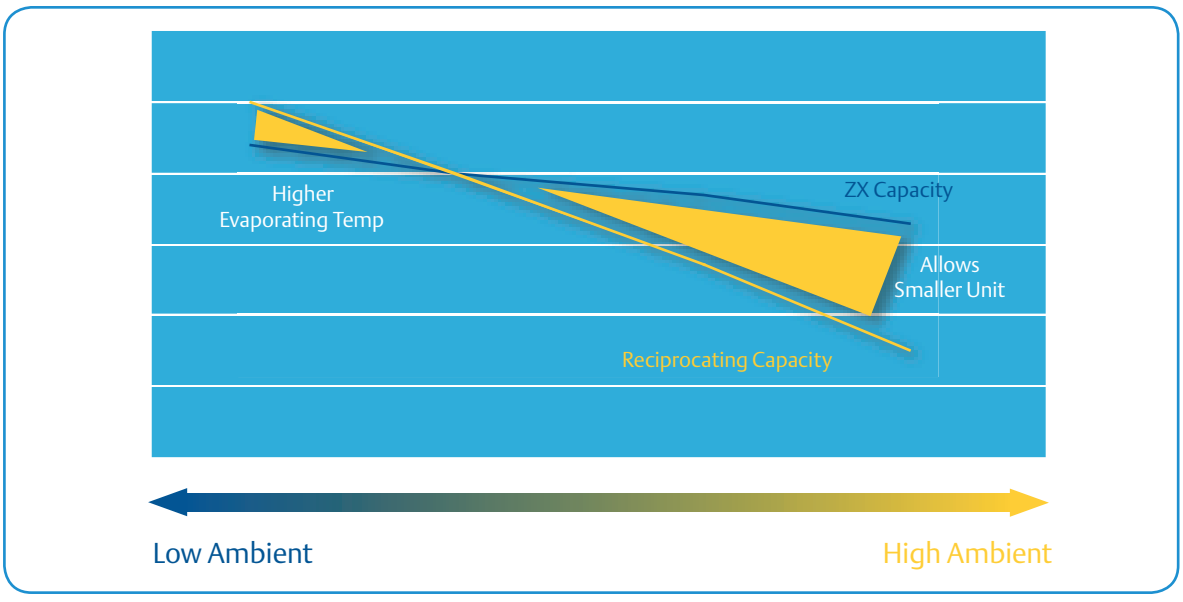


Figure 04

Nomenclature

Z	X	L	0	2	0	E	-	T	F	D	-	4	5	1
Unit Family		= Medium Temp L = Low Temp D = Digital Medium Temp		2.0 to 7.6 HP		E = Ester oil O = Mineral Oil		PFJ = 220V/240V- 1ph- 50 Hz	TFD = 380V/420V- 3ph- 50 Hz	TF5 = 200V/230V- 3ph- 60 Hz TF7=380 - 3ph - 60 Hz		Bill of Material		
Base Model								Electrical Code				Bill of Material		

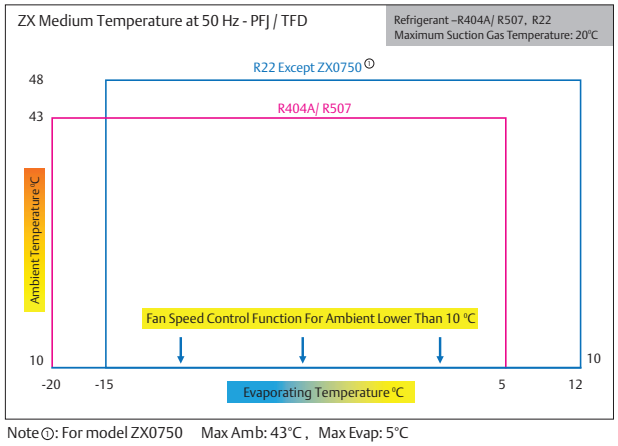
BOM

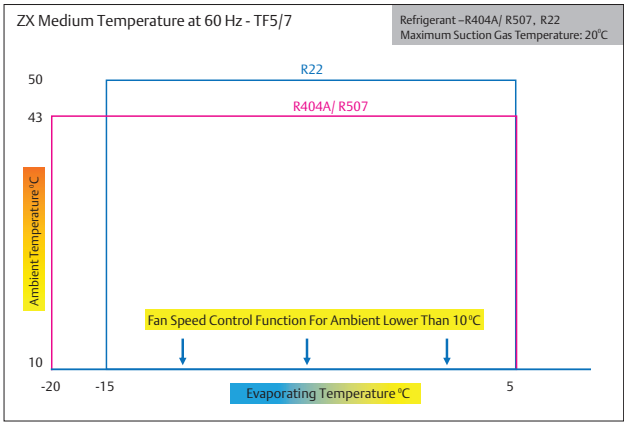
CDU Family	ZX		ZXL			ZXD		
BOM	401	451	451	461	471	450	451	461
Liquid Line Filter Dryer/Sight Glass								
Oil Separator								
Accumulator								
Adjustable LP Switch								
Fixed LP Switch								
E2 Controller								
Diagnostic Module								
Buzzer								
Digital Scroll Controller								
Fan Speed Controller								
Circuit Breaker								
Sound Jacket								
Defrost Module	ACC	ACC	ACC		ACC			
Filter Drier					V			

Notes: E2 controller has fan speed control function
"V" indicates flare type connection
"ACC" indicates accessory

Envelope

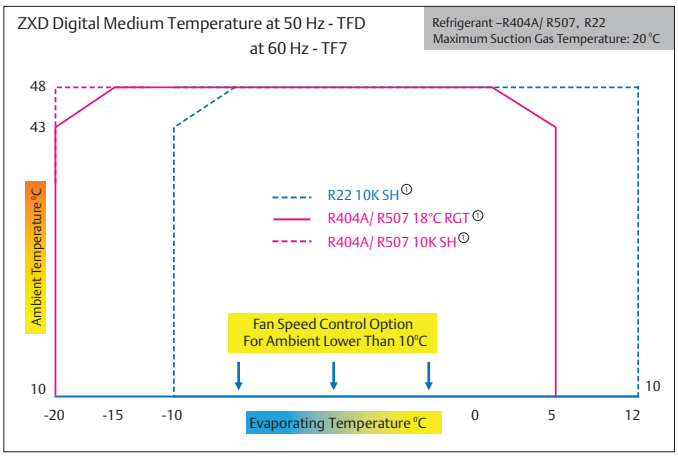
ZX Family : Medium Temperature





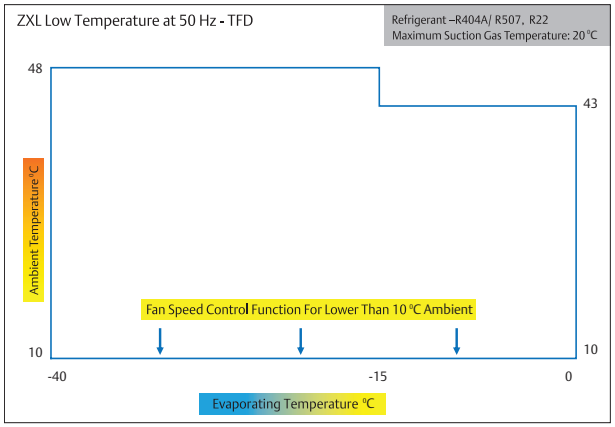
Note ①: For model ZX0750 Max Amb: 43°C , Max Evap: 5°C

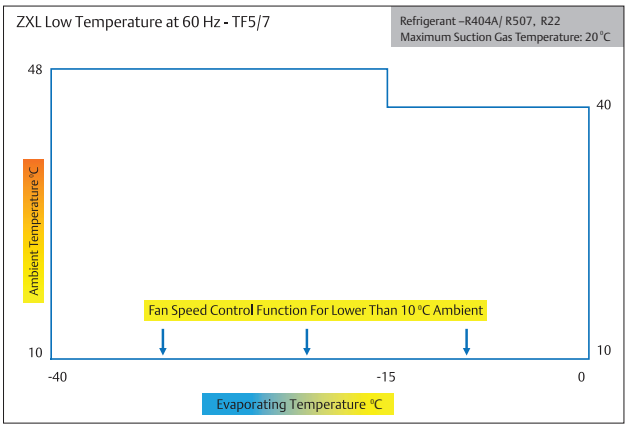
ZXD Family : Digital Medium Temperature



Note ①: For model ZXD075/E Max Amb: 43°C , Max Evap: 5°C

ZXL Family : Low Temperature





Physical Layout of the ZX Platform CDU

The unique features of ZX platform CDU as described above are quite different from the conventional CDUs available in the market. Apart from this, ZX platform CDU also comes with a package of other conventional features which are part of a well designed condensing unit.

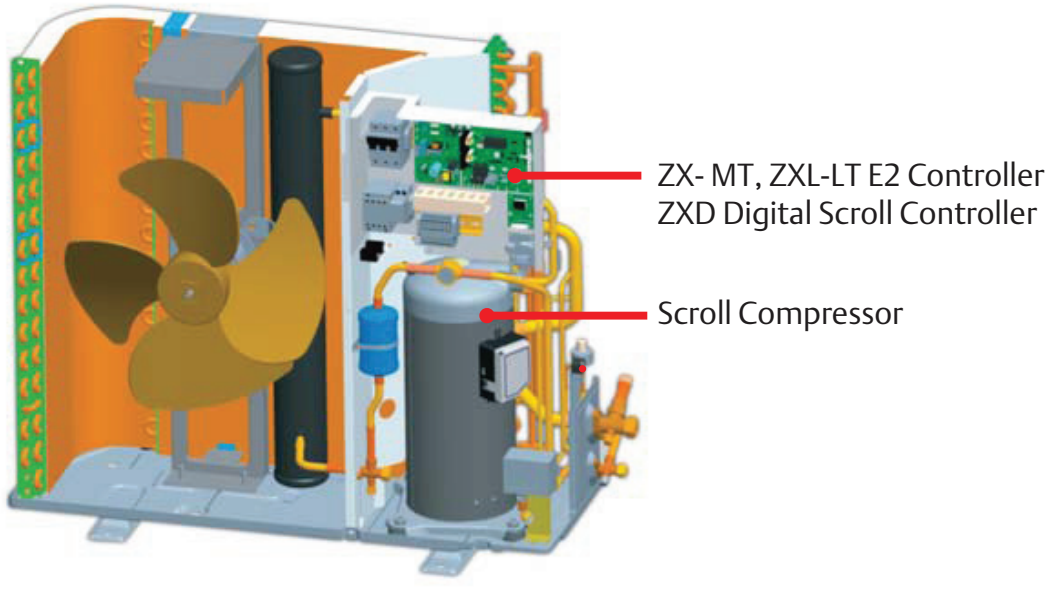


Figure 05: Identifies the electronic controller assembly on a ZX Platform CDU

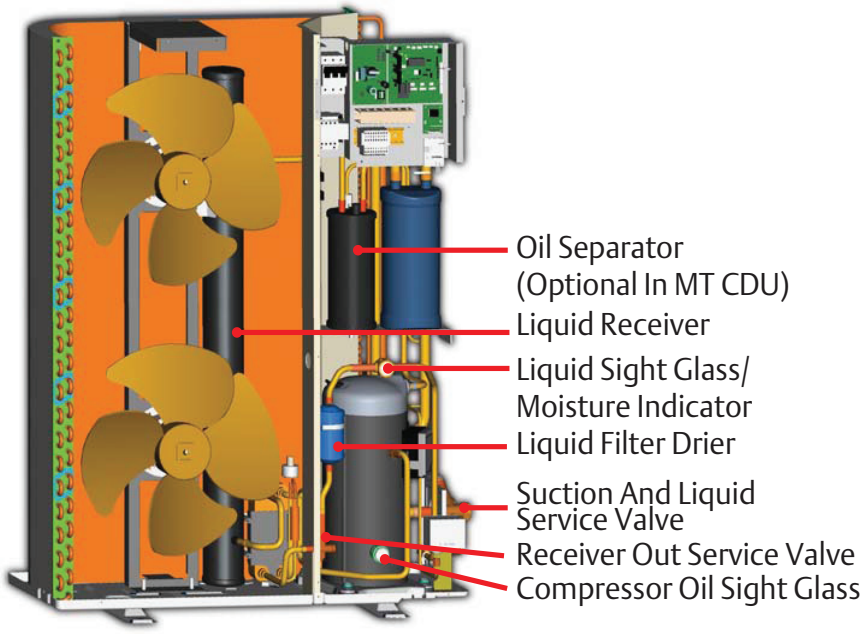


Figure 06: Identifies other major components layout on a ZX Platform CDU

Application Guideline

In ZX MT units, suction line injection is applied to the compressor suction. Suction line injection allows a reliable and efficient MT envelope of up to -15°C (R22) and -20°C (R404A) evaporating temperature. In suction line injection, a part of liquid refrigerant is added into the compressor suction gas. Suction injection de-superheats the suction gas and controls the compressor discharge temperature. This is implemented through electronic control by the E2 controller and an electronic expansion valve (EXV). The E2 monitors the compressor discharge temperature and optimizes the opening of the EXV for optimal discharge gas control.

In ZXL LT units, vapor injection is applied to the compressor. Vapor injection enhances the compressor efficiency by applying 2-stage compression with an economizer refrigeration cycle. Vapor injection eliminates the need for liquid injection, which would otherwise have been required to operate a reliable LT envelope down to -40°C evaporating temperature. In vapor injection, a part of liquid refrigerant is expanded and passed through a heat exchanger. In the heat exchanger, this expanded refrigerant absorbs heat from the main liquid line and sub-cool the main liquid. The expanded refrigerant vaporizes while passing through the heat exchanger and is supplied back into the scroll intermediate pockets through the vapor-injection tube. The sub-cooling of the main liquid increases the compressor capacity by as much as 30%. The figure 14 below identifies the key components of the vapor injection assembly.

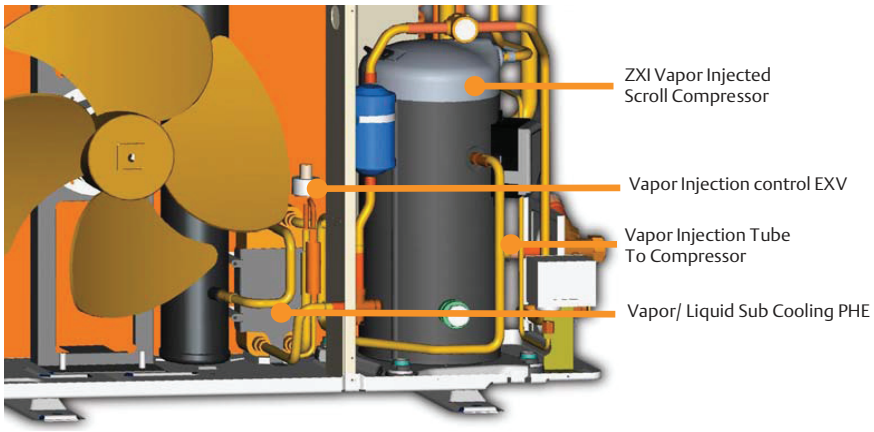
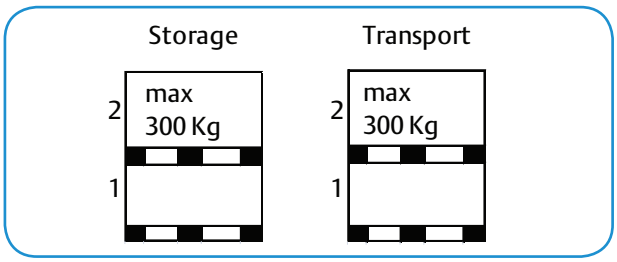


Figure 07: Key Components Of The Vapor Injection Assembly

Condensing Unit Handling

Transport and Storage

Move ZX/ZXD/ZXL unit only with appropriate mechanical or handling equipment according to weight. Keep in the upright position. **Do not stack single boxes on top of each other without pallet in any case.** Keep the packaging dry at all times.



Net Weight

ZX		ZXD		ZXL	
Model	Weight (kg)	Model	Weight (kg)	Model	Weight (kg)
ZX0200/E	76	ZXD0400/E[2]	104	ZXL0200/E	79
ZX0250/E	79	ZXD0500/E[3]	112	ZXL0250/E	81
ZX0300/E	79	ZXD0600/E[4]	114	ZXL0300/E	81
ZX0400/E[1]	91	ZXD0750/E[5]	122	ZXL0350/E	93
ZX0500/E	108			ZXL0400/E	93
ZX0600/E	112			ZXL0500/E	106
ZX0750/E	118			ZXL0600/E	116
ZX0760/E	121			ZXL0750/E	121

Notes: *[1] 100 kg for models under 60 Hz TF5/7 and 50 Hz PFJ*
[2] 109 kg for models under 60 Hz TF7
[3] 117 kg for models under 60 Hz TF7
[4] 121 kg for models under 60 Hz TF7
[5] 127 kg for models under 60 Hz TF7

Installation

Copeland ZX condensing units are delivered with a holding charge of neutral gas. The condensing unit should be located in such a place to prevent any dirt, plastic bag, leaves or papers from covering the condenser and its fins. The unit must be installed without restricting the airflow. A clogged condenser will increase the condensing temperature, thus reduce the cooling capacity, and lead to a high-pressure switch tripping. Clean the condenser fins on a regular basis.

Installation / Piping Instructions

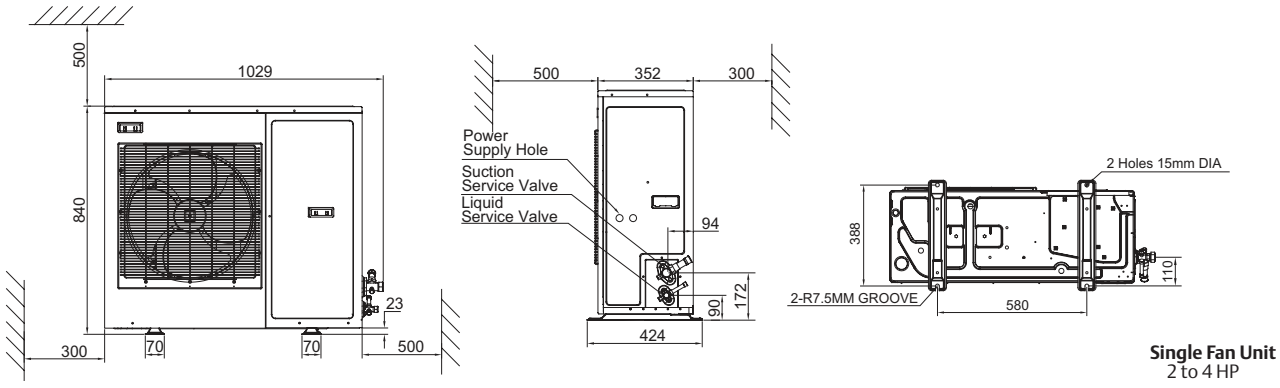
It is recommended that a clearance of 8 inches from the wall (or the next unit) be maintained from the unit's left and rear panel whereas a clearance of 20 inches is to be maintained from the unit's right, top and front panels. Both service access and airfl ow have been considered in making these recommendations. Where multiple units are to be installed in the same location, careful consideration for proper clearance needs to be given to each individual unit.

Ideally, the unit should be mounted level on a solid concrete slab with rubber strips between unit feet and concrete. However, these units have been designed for mounting on suitable brackets for wall mounting. In this case it is equally important that the spatial guidelines given above are followed, and additional consideration needs to be given for possible air recycling if units are stacked above and below each other. In general terms, air by-pass around each condenser and between each unit should be avoided at all times.

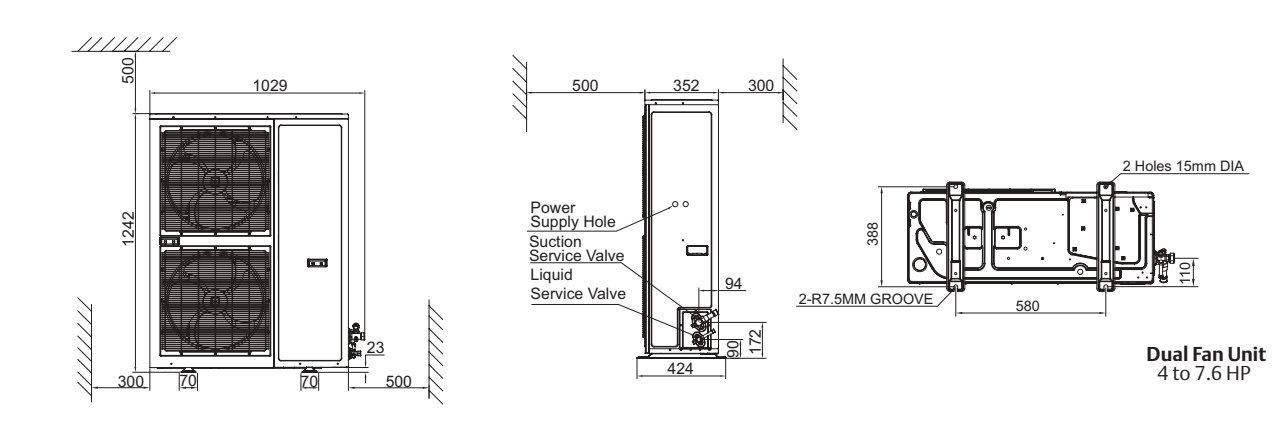
Pipe sizing should not only be of sufficient size to ensure optimum performance and good oil return, but it also needs to take into account the full capacity range through which this particular unit will need to operate. Follow the ASHRAE guidelines for proper piping practices.

Location and Fixing

The unit should always be installed in a location that ensures clean air flow. It is recommended that a clearance of 300 mm from the wall (or the next unit) be maintained from the unit's left and rear panels whereas a clearance of 500 mm must be maintained from the unit's right, top and front panels (seen facing the front of the unit). Both service access and airflow have been considered in making these recommendations. Where multiple units are to be installed in the same location, the contractor needs to consider each individual case carefully. There can be many variations of unit quantities and available space and it is not the intention of this manual to go over these. Ideally, the unit should be mounted on a solid concrete slab with anti-vibration pads between unit feet and concrete. However the ZX condensing unit has also been designed for wall mounting on suitable brackets. Wall mounting brackets are not included. Another factor to consider in finding a good installation site is the direction of the prevailing wind. For example, if the air leaving the condenser faces the prevailing wind, the air flow through the condenser can be impeded, causing high condensing temperatures ultimately resulting in reducing unit life. A baffle is a remedy for this situation.



Fixing dimensions and distances - Single fan unit



Fixing dimensions and distances - Dual fan unit

Electrical Connection

Power Supply

The ZX condensing unit electrical connection to the power supply must be made by qualified technicians, who should refer to the electrical diagrams located inside the electric connection panel. The units are designed for below power supply at ± 10% voltage tolerance. The circuit breaker must be switched off before opening the front panel.

Codes	HZ	Phase	Voltages
PFJ	50	1	220/240
TFD	50	3	380/420
TF7	60	3	380
TF5	60	3	200/230

Electrical Wiring

Before commissioning, ensure that the neutral "N" wire is connected to the terminal block ("N" furthest to the right). After proper connection of the ZX condensing unit, the control LED on the power board and control board will light. For more details, see wiring diagram in Appendix.

Refrigeration Connections

Refrigeration Piping Installation

All interconnecting pipes should be of refrigeration grade, clean, dehydrated and must remain capped at both ends until installation. Even during installation, if the system is left for any reasonable period of time (say two hours), pipes should be re-capped to prevent moisture and contaminants from entering the system.

Do not assume that the service connection sizes on the unit (at the service valves) are the correct size to run your interconnecting refrigeration pipes. The service valve sizes have been selected for convenience of installation and in some cases (larger units) these may be considered too small. However for the very short pipe run within our units, these service connection sizes are adequate. All interconnecting pipes should be sized to satisfy the duty required.

Usually the suction line is insulated, but the liquid line is not. However the liquid line can pick up additional heat from the ambient and adversely affect the sub-cooling desirable for the liquid refrigerant before it enters the expansion valve.

The pipe should be sized to ensure optimum performance and good oil return. The sizing must also take into account the full capacity range through which this particular unit will need to operate.

Pipe runs should be kept as short as possible, using the minimum number of directional changes. Use large radius bends and avoid trapping of oil and refrigerant. This is particularly important for the suction line. The suction line should ideally slope gently towards the unit. Recommendation slope is 1/200~1/250. P traps, double risers and reduced pipe diameters may be required for suction lines where long vertical risers cannot be avoided. All pipes should be adequately supported to prevent sagging which can create oil traps. The recommended pipe clamp support distance is shown in the table.

Tube Size	Max distance between 2 clamp support
12.7mm (1/2 inch)	1.20 m
16.0mm (5/8 inch)	1.50 m
22.0mm (7/8 inch)	1.85 m
28.5mm (1 1/8 inch)	2.20 m

ZXL Liquid Line Insulation

ZXL liquid line should be insulated with a 19 mm insulation thickness. Temperature could be as low as –15°C.

Vapor Injection: Specific Application Tips

ZXL-LT CDU

ZXL-LT CDU applies vapor injection technology. As explained in the previous section, vapor injection improves LT operational efficiency and provides a reliable LT envelope. Vapor injection sub cools the main liquid line using the economizer cycle. The sub cooling of liquid line calls for some specific application tips which are applicable only for ZXL-LT CDU. They are;

1. Liquid line pipe connecting the CDU service valve to the evaporator expansion valve has to be well insulated separately. The recommended insulation thickness is 12.5 mm (1/2 inches)
2. The lower liquid in temperature can increase the evaporator expansion valve capacities. Please follow valve manufactures recommended liquid temperature correction factors for proper selection of evaporator expansion valve.

ZXL-LT Unit (Liquid Line Temperature)

Typical Liquid Line Temperature °C

R22	Ambient °C					
Evap Temp °C	20	27	32	38	43	48
-40	-11	-3	7	7	11	14
-35	-8	-1	9	9	13	16
-30	-4	2	12	12	16	19
-25	0	5	14	14	19	23
-20	5	9	18	18	22	26

R404A	Ambient°C					
Evap Temp °C	20	27	32	38	43	48
-40	-8	-1	3	8	13	19
-35	-4	2	6	11	15	21
-30	0	6	9	13	18	23
-25	5	10	13	17	21	26
-20	9	14	17	20	24	30

R22	Ambient °C					
-15	10	13	21	21	25	30
-10	15	17	25	25	29	
-5	20	22	29	29	33	
0	26	26	33	33	37	

R404A	Ambient°C					
-15	13	18	21	24	28	34
-10	16	22	25	29	33	
-5	20	26	29	33	37	
0	23	29	33	38	42	

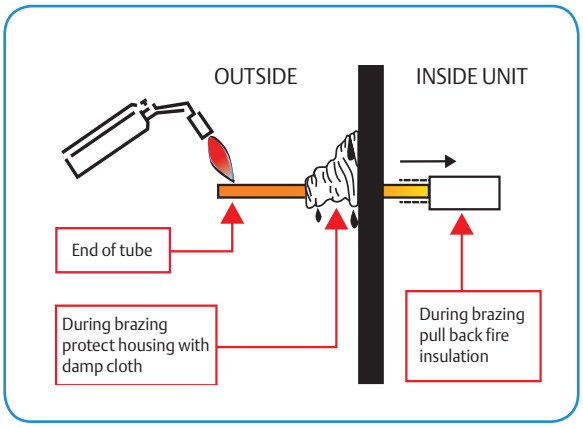
Typical Values With Individual Values Within +/-5°C
Note: ZXL CDU is designed with vapor injection technology. The condenser liquid line temperature will be sub cooled by the vapor injection plate heat exchanger.

Brazing Recommendations

Maintain a flow of oxygen-free nitrogen through the system at a very low pressure during brazing. Nitrogen displaces the air and prevents the formation of copper oxides in the system. If copper oxidization is allowed to form, the copper oxide material can later be swept through the system and block screens such as those protecting capillary tubes, thermal expansion valves, and accumulator oil return holes.

This minimizes any entry of contaminants and moisture.

- Remove the liquid line connection cap.
- Then remove the suction connection cap.
- Open both valves midway. Care should be taken to avoid the holding charge from releasing too quickly.
- Be sure that tube fitting inner diameter and tube outer diameter are clean prior to assembly.
- Since both tubes are extended from the condensing unit housing, we recommend insulating the housing by using a wet cloth on the copper tubing.
- Recommended brazing materials: a copper / phosphorous or copper / phosphorous / silver alloy rod should be used for joining copper to copper whereas to join dissimilar or ferric metals, use a silver alloy rod, either flux coated or with a separate coating.
- Use a double tip torch.



Start Up and Operation

Before commissioning, ensure that all valves on the condensing unit are fully opened.

Evacuation

The evacuation procedure is based upon achieving an actual system vacuum standard and is not time dependent. Before the installation is put into commission, it has to be evacuated with a vacuum pump. Proper evacuation reduces residual moisture to 50ppm. The installation of adequately sized access valves at the furthest point from the compressor in the suction and liquid lines is advisable. To achieve undisturbed operation, the compressor valves are closed and the system is evacuated down to 0.3 mbar / 0.225 Torr. Pressure must be measured using a vacuum pressure (Torr) gauge on the access valves and not on the vacuum pump; this serves to avoid incorrect measurements resulting from the pressure gradient along the connecting lines to the pump.

Charging Procedure

Refrigerant Charging Procedure

The scroll compressor design requires system charging as quickly as possible with liquid refrigerant into the liquid line. This will avoid running the compressor under conditions where there is insufficient suction gas. Sufficient suction gas is available to cool not only the motor but also the scrolls. Temperature builds up very quickly in the scrolls if this is not done. Do not charge vapor (gas) refrigerant into the ZX Scroll unit. The suction service valve must not be fully closed at any time while the compressor is running. To do so would cause damage to the compressor in the same manner as explained above. This valve is provided for ease of connection and for the fitting of service gauges without removing the unit panel. It is recommended to charge the ZX unit with refrigerant via its service valves. It is recommended to break the vacuum in the system with a partial charge of the refrigerant, before starting the system. For charge adjustment, it is recommended to check the liquid sight glass just before the expansion valve.

Oil Charging Procedure

ZX CDUs are delivered with a full oil charge in both the compressor and the oil separator. The oil level should be visible in the compressor sight glass. All systems will trap some oil and in some cases it may be necessary to add oil if pipes are long, if the vertical rise is high and if the piping is not well designed. The oil level should be monitored carefully during commissioning, checked after 4 – 8 hours and checked again after 24 hours of normal operation. The ideal oil level is between ¼ and ¾ sight glass level but if any oil is visible in the sight glass the compressor can operate safely. If oil is not visible in the sight glass proceed as follows:

1. Perform a manual defrost on all evaporators simultaneously.
2. Operate the compressor (at 100% load for ZXD) for 5 minutes after defrost is complete. The unit will automatically tend to operate (at 100% load for ZXD) after defrost as the evaporators recover their set-point temperatures.
3. Check that the oil level is at ¼ sight glass or higher but not over the top of the sight glass.
4. If oil is not visible add oil until the level reaches the ¾ sight glass level.

Adding Oil

The simple and ideal way to add oil is to pump the oil into the suction side when the unit is running. Discharge pressure from the unit or refrigerant pressure from a cylinder can be used to force oil into the suction side. The oil will go directly into the compressor and the level increase will be immediate.

NEVER CLOSE THE UNIT SUCTION VALVE AND USE THE COMPRESSOR TO SUCK OIL FROM A CONTAINER THAT IS AT ATMOSPHERIC PRESSURE. THIS COULD DESTROY THE SCROLL COMPRESSOR IN A MATTER OF SECONDS.

Tools required: Manifold gauge set and hoses, oil tank of ~ 1 litre volume with suitable connections, oil, refrigerant.

Qualified Refrigerants And Oil

REFRIGERANT	OIL
R404A/507	Emkarate RL 32 3MAF Mobil EAL Artic 22 CC
R22	Suniso 3GS

Oils are pre-charged in both compressor and oil separator. Total oil volume (liter) for each unit is shown in the table below:

ZX			ZXD		ZXL	
Model	BOM		Model	BOM	Model	BOM
	401	451		ALL		ALL
ZX0200/E	1.18	1.68			ZXL0200/E	1.06
ZX0250/E	1.33	1.83			ZXL0250/E	1.06
ZX0300/E	1.33	1.83			ZXL0300/E	1.06
					ZXL0350/E	1.74
ZX0400/E	1.83	2.33	ZXD0400/E	1.74	ZXL0400/E	1.74
ZX0500/E	1.83	2.33	ZXD0500/E	2.27	ZXL0500/E	1.74
ZX0600/E	1.66	2.16	ZXD0600/E	2.27	ZXL0600/E	2.27
ZX0750/E	1.66	2.16	ZXD0750/E	2.27	ZXL0750/E	2.27
ZX0760/E	1.66	2.16				

Scroll Compressor Rotation Direction

Rotation Direction of Three Phase Scroll Compressors will only compress in one rotational direction. Direction of rotation is not an issue with single phase compressors since they will always start and run in the proper direction. Three phase compressors will rotate in either direction depending upon phasing of the power. Since there is a 50-50 chance of connecting power in such a way as to cause rotation in the reverse direction, it is important to include notices and instructions in appropriate locations on the equipment to ensure proper rotation direction when the system is installed and operated. Verification of proper rotation direction is made by observing that suction pressure drops and discharge pressure rises when the compressor is energized. Reverse rotation of a scroll compressor also results in substantially reduced current draw compared to specification sheet values. Suction temperature will be high, discharge temperature will be low and the compressor may be abnormally noisy. There is no negative impact on durability caused by operating three phase Copeland Scroll compressors in the reversed direction for a short period of time (under one hour). After several minutes of operation in reverse, the compressor's motor protection system will trip the compressor off. If allowed to repeatedly restart and run in reverse without correcting the situation, the compressor will be permanently damaged. All three phase scroll compressors are identically wired internally. As a result, once the correct phasing is determined for a specific system or installation, connecting properly phased power leads to the same terminals will maintain proper rotation direction.

Brief Power Interruptions

Brief power interruptions (less than ½ second) may result in powered reverse rotation of single-phase refrigeration scroll compressors. High-pressure discharge gas expands backward through the scrolls at power interruption causing the scroll to orbit in the reverse direction. If power is reapplied while this reversal is occurring, the compressor may continue to run noisily in the reverse direction for several minutes until the compressor internal protector trips. This has no negative effect on durability. When the protector resets, the compressor will start and run normally.

Maximum Compressor Cycle

Maximum permitted starts per hour is 10.

Check Before Starting & During Operation

Both valves should be fully opened on the liquid line, in order to prevent trapping liquid.

- Check that all valves are fully opened.
- After starting and operation conditions are stabilized, it is recommended to check oil level in the compressor(s) and see if there is a need to add oil to ensure a sufficient oil level (halfway up the sight glass).

Electronic Controller Assembly on a ZX Platform CDU

ZX/ZXL Controller Assembly

ZX platform E2 control offers multiple features which are unique to refrigeration condensing units. E2 real-time control monitors and optimizes the suction or vapor injection performance to offer efficient performance in ZX MT and LT units. E2 also monitors compressor operating parameters, so as to protect the system from unsafe operating parameters such as passing through a peak temperature hour of a peak ambient day; or drop-out of a power-phase; or continued refrigerant loss in the system. E2 controller detects these situations and, as a first step, will initiate some corrective actions.

For example, when the LT unit experiences an extreme temperature day, E2 control decides to switch from vapor-injection-optimization to discharge-gas temperature-control to allow the compressor to run safely and pass the extreme weather hours.

Another fault condition which is common in refrigeration systems is compressor overload. If the condenser coils are not cleaned regularly, the compressor operating discharge pressures rises. This condition is gradual and in conventional CDUs, no advance warning is provided to the user on this approaching undesirable situation. Ultimately, in such a situation, the internal protector in the compressor trips. Two problems arise due to internal protector-trip. First: there is no alarm to detect the trip and second: a compressor internal protector reset may take as long as an hour. This could be critical for the quality of frozen food in freezers or cases. On the other hand, ZXL E2 controller detects the overload externally and actions a temporary shutdown. E2 Diagnostics will then start transmitting a fault signal. After multiple attempts, and if the error repeats itself as high as six times within an hour, the E2 will finally shutdown the unit to avoid expensive compressor failure.

The E2 will activate a buzzer to send an alarm signal at unit-lockout which then requires a manual restart. The buzzer is a standard part of the ZX platform Gold version CDU . The buzzer can be remotely mounted and has volume and mute capability. The E2 is also designed to activate an externally connected telephone dialer to send fault notice on a preset telephone number.

ZX platform units are designed to operate under extreme ambient temperatures of up to 48°C. This extremely high-ambient envelope, combined with the intelligent E2 controller, provides unparalleled benefits to customers.

The E2 control is also designed to apply a ZX defrost (DF) module. The ZX DF module is a basic time initiated DF module and is supplied as an optional accessory. The DF module has two rotary switches by which the user can set up the defrost duration and defrost interval. The DF module also enables a manual defrost as an override to the rotary switch setting of defrost interval.

The E2 controller consists of two electronic board assemblies: E2 power board and control board. The power board supplies constant DC power to the E2 control board. The E2 control board carries the intelligent chip containing the canned programs. The entire assembly is pre-installed and wired in the factory on a new unit. Both electronic boards carry a LED light . If the LED lights are on after power-up of the unit, it indicates normal and proper operation of the electronic boards. Once these lights are on, the rest of the unit including the compressor is monitored and digital messages are shown on the diagnostic panel.

Table 01 shows a list of fault detections enabled by E2 controller and diagnostics on ZX platform CDU. The diagnostics are standard features on the Emerson ZX platform Gold version.

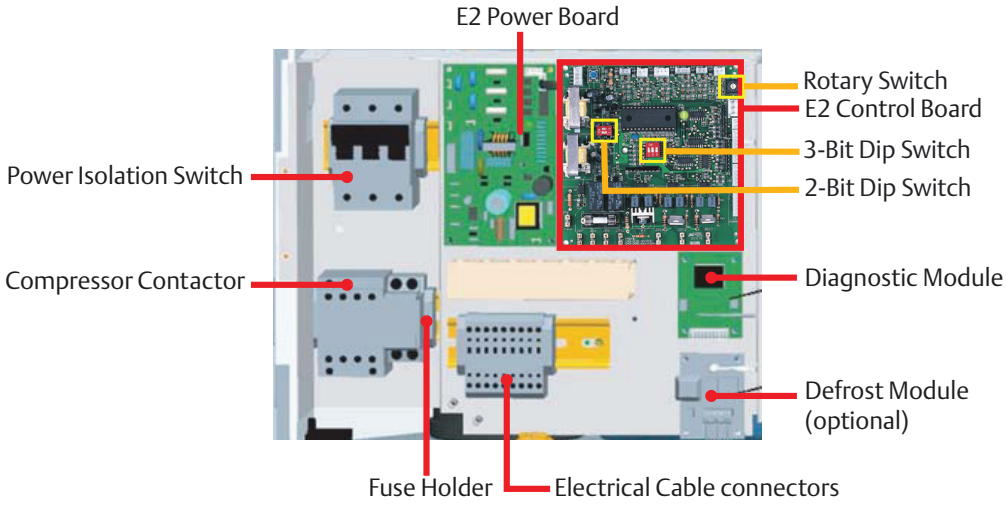
Table 02 summarizes fault conditions under which the E2 controller initiates “temporaryshutdown—with-auto-restart” and “lock-out trip-condition with- manual-restart.”

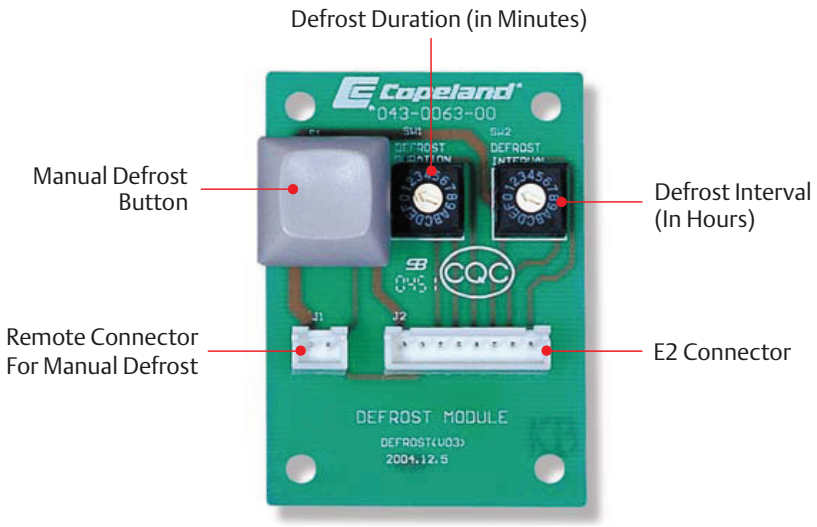
E2 Fault Detection Items
* Compressor Phase Reversal
* Loss of Phase (In 3 Phase Models)
* Compressor Over Current
* Compressor Protector Trip Detection
* Discharge Gas Temperature Over Heat
* High Pressure Cut Out
* Low Pressure Cut Out (MT CDU Only)
* Excessive Refrigerant Flood Back
*Compressor Minimum Off Time
* E2 Sensor Failures

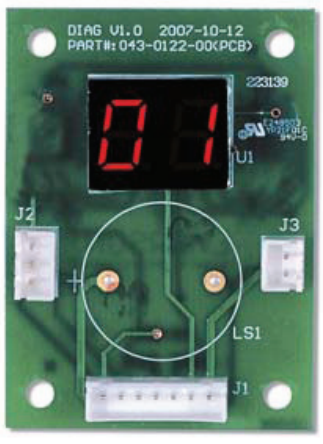
Table 01

Fault	Temporary Shutdown/Auto Restart	Lock Out Errors/Manual Restarts
Phase Reversal/ Loss Of Phase		Incorrect 3 Phase Sequence
High Pressure Trip	< 5 Trips In 1 Hour	6th Trip Within 1 Hour
Low Pressure Trip (only on MT Units)	At Every LP Trip	No Lock Out
Discharge Gas Temperature Overheat	< 5 Trips In 1 hour	6th Trip Within 1 Hour
Compressor Over Current	< 5 Trips In 1 Hour	6th Trip Within 1 Hour
Compressor Short Cycling	3 Minutes Between Starts	No Lock Out
Excessive Suction Flood Back	~ 20% Flood Back, Warning Only	No Lock Out
Discharge Sensor Failure (only on LT Units)	< 5 Trips In 1 Hour	6th Trip Within 1 Hour
Other Thermal Sensor Failures	Warning Only	No Lock Out

Table 02



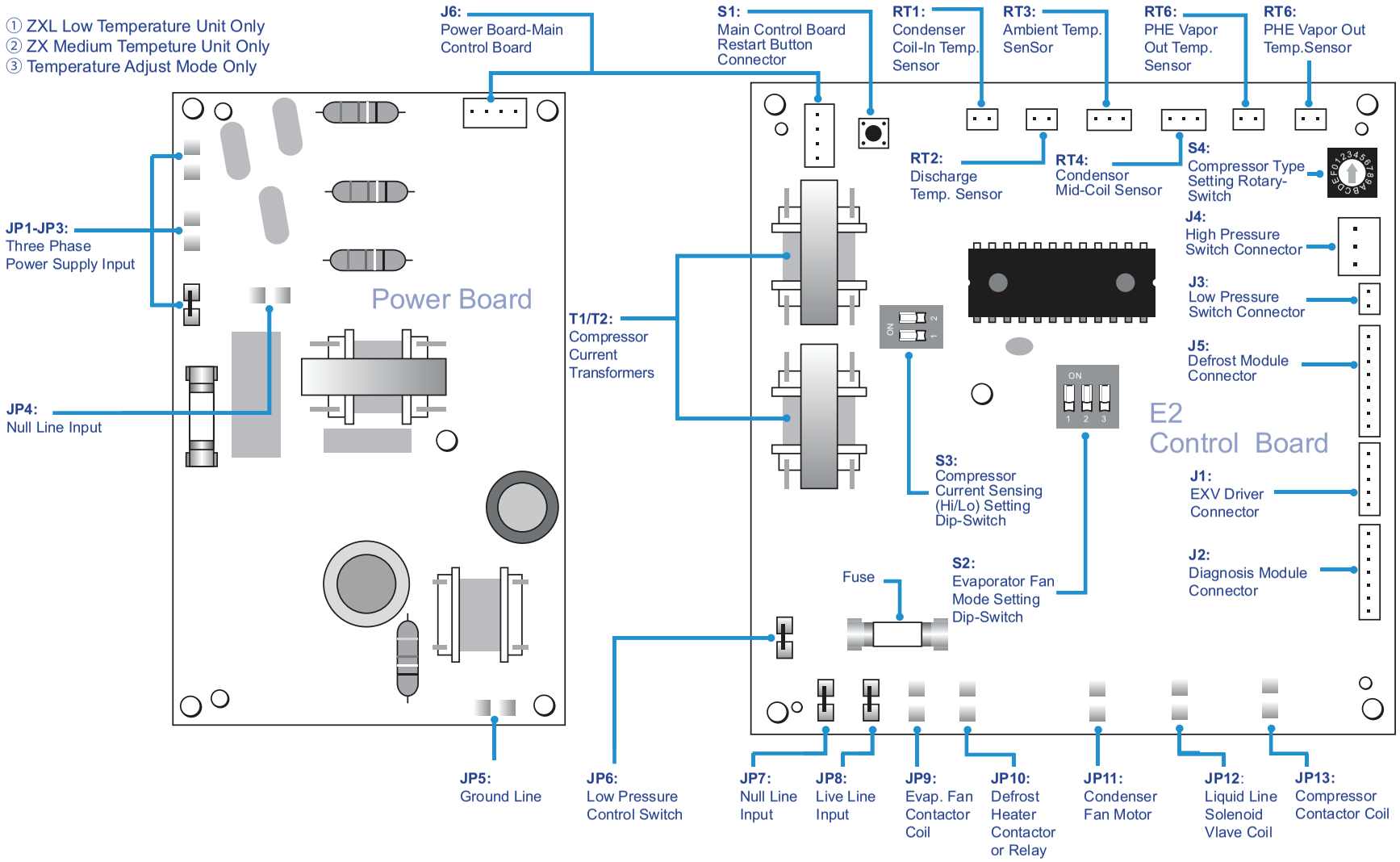




E2 Display Diagnostic

Remote Buzzer
With Volume

Power Board and E2 Control Board Diagram


① ZXL Low Temperature Unit Only
② ZX Medium Tempeture Unit Only
③ Temperature Adjust Mode Only
J6: Power Board-Main Control Board
S1: Main Control Board Restart Button Connector
RT1: Condenser Coil-In Temp. Sensor
RT3: Ambient Temp. SenSor
RT6: PHE Vapor Out Temp. Sensor
RT6: PHE Vapor Out Temp.Sensor
RT2: Discharge Temp. Sensor
RT4: Condensor Mid-Coil Sensor
S4: Compressor Type Setting Rotary-Switch
J4: High Pressure Switch Connector
J3: Low Pressure Switch Connector
J5: Defrost Module Connector
JP1-JP3: Three Phase Power Supply Input
Power Board
T1/T2: Compressor Current Transformers
JP4: Null Line Input
E2 Control Board
S3: Compressor Current Sensing (Hi/Lo) Setting Dip-Switch
J1: EXV Driver Connector
J2: Diagnosis Module Connector
Fuse
S2: Evaporator Fan Mode Setting Dip-Switch
JP5: Ground Line
JP6: Low Pressure Control Switch
JP7: Null Line Input
JP8: Live Line Input
JP9: Evap. Fan Contactor Coil
JP10: Defrost Heater Contactor or Relay
JP11: Condenser Fan Motor
JP12: Liquid Line Solenoid Vlave Coil
JP13: Compressor Contactor Coil

E2 Control Board Dip Switch Setting

The E2 control board has two dip switches (2-bit and 3-bit) and one rotary switch. The rotary switch and the 2-bit dip switch are used in combination to select the compressor used on the unit. The selected compressor relates to the over-current-limit for the specified unit. The 3-bit dip switch is used if the customer chooses to use the E2 control for evaporator fan control. Fig 15 shows the dip switches and rotary switch in the E2 control board.

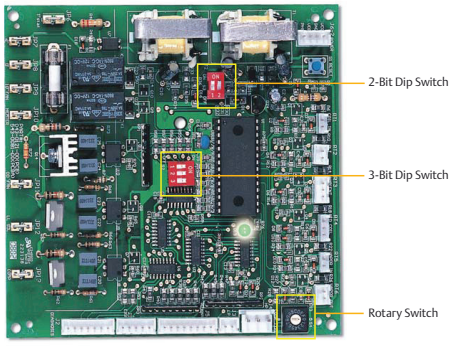
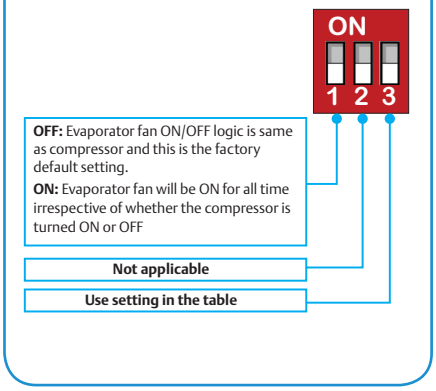


Figure 15: E2 Controller

E2 Control Board - Rotary Switch And Dip Switch Setting (ZX-MT & ZXL-LT)

Model	Rotary Switch	3-Bit No. 3	2-Bit 1/2
ZX0200/E-PFJ	7	OFF	ON/ON
ZX0250/E-PFJ	8	OFF	ON/ON
ZX0300/E-PFJ	9	OFF	ON/ON
ZX0400/E-PFJ	A	OFF	OFF/OFF
ZX0200/E-TFD	1	OFF	ON/ON
ZX0300/E-TFD	2	OFF	ON/ON
ZX0400/E-TFD	3	OFF	ON/ON
ZX0500/E-TFD	4	OFF	ON/ON
ZX0600/E-TFD	5	OFF	ON/ON
ZX0750/E - 760/E-TFD	6	OFF	ON/ON
ZX0200/E-TF5	1	ON	ON/ON
ZX0300/E-TF5	2	ON	ON/ON
ZX0400/E-TF5	3	ON	ON/ON
ZX0500/E-TF5	4	ON	OFF/OFF
ZX0600/E-TF5	5	ON	OFF/OFF
ZX0750/E - 760/E-TF5	6	ON	OFF/OFF
ZX0200/E-TF7	7	ON	ON/ON
ZX0300/E-TF7	8	ON	ON/ON
ZX0400/E-TF7	9	ON	ON/ON
ZX0500/E-TF7	A	ON	ON/ON
ZX0600/E-TF7	A	ON	ON/ON
ZX0750/E - 760/E-TF7	B	ON	ON/ON
ZXL0200/E-TFD	1	OFF	ON/ON

Model	Rotary Switch	3-Bit No. 3	2-Bit 1/2
ZXL0250/E-TFD	2	OFF	ON/ON
ZXL0300/E-TFD	3	OFF	ON/ON
ZXL0350/E-TFD	4	OFF	ON/ON
ZXL0400/E-TFD	5	OFF	ON/ON
ZXL0500/E-TFD	6	OFF	ON/ON
ZXL0600/E-TFD	7	OFF	ON/ON
ZXL0750/E-TFD	8	OFF	ON/ON
ZXL0200/E-TF5	1	ON	ON/ON
ZXL0250/E-TF5	1	ON	ON/ON
ZXL0300/E-TF5	2	ON	ON/ON
ZXL0350/E-TF5	3	ON	OFF/OFF
ZXL0400/E-TF5	4	ON	OFF/OFF
ZXL0500/E-TF5	5	ON	OFF/OFF
ZXL0600/E-TF5	6	ON	OFF/OFF
ZXL0750/E-TF5	7	ON	OFF/OFF
ZXL0200/E-TF7	8	ON	ON/ON
ZXL0250/E-TF7	8	ON	ON/ON
ZXL0300/E-TF7	9	ON	ON/ON
ZXL0350/E-TF7	A	ON	ON/ON
ZXL0400/E-TF7	B	ON	ON/ON
ZXL0500/E-TF7	C	ON	ON/ON
ZXL0600/E-TF7	D	ON	ON/ON
ZXL0750/E-TF7	D	ON	ON/ON


ON
1 2 3
OFF: Evaporator fan ON/OFF logic is same as compressor and this is the factory default setting.
ON: Evaporator fan will be ON for all time irrespective of whether the compressor is turned ON or OFF
Not applicable
Use setting in the table

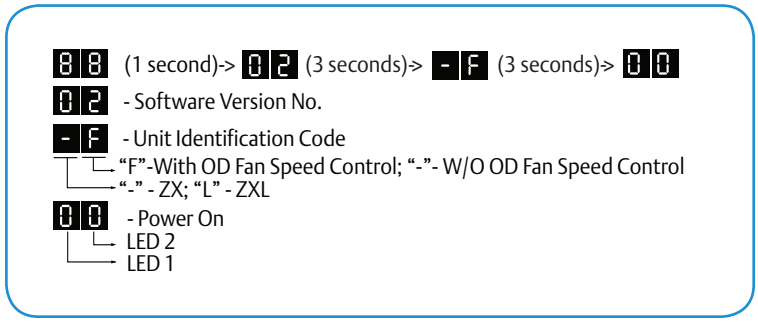
Notes: The settings given in the table are pre-set at the factory for new units.

Defrost Module Function Set

Time of Defrost		Time of Defrost Interval	
Rotary Switch1	Time(min)	Rotary Switch2	Time(hours)
0	0	0	0
1	5	1	1
2	10	2	2
3	15	3	3
4	20	4	4
5	25	5	5
6	30	6	6
7	35	7	7

Diagnostic Initialization Message (ZX-MT and ZXL-LT)

When the unit is initially powered on, the diagnostic module will show the following signals.



Diagnostic messaging - LED definition (ZX-MT and ZXL-LT)

LED1-Unit Status		LED2-Error/Warning Code	
Display	Status	Display	Error/Warning
0	Idle (Stop When Reach To Set-point)	0	No error/warning
1	Run	1	Compressor Phase Error (Wrong Phase Sequence/Loss of Phase)
2	About To Start ①	2	Compressor Inside Thermal Protector Trip
3	Defrost	3	Compressor Over Current
4	Stop Due to Error	4	Overheat
5	Lockout	5	Compressor High Pressure Cut Out
		6	Compressor Low Pressure Cut Out ②
		7	DLT Thermistors Failure
		8	Ambient Temperature Sensor Failure
		9	Mid-coil Temperature Sensor Failure
		A	PHE Vapor In Temperature Sensor Failure or Over Range ③
		C	PHE Vapor Out Temperature Sensor Failure or Over Range ③
		E	System Liquid Flood Back Warning

Notes: ① New start, normal start by program and any start request delay

② LP Cutout"signal is not applicable in ZXL condensing unit.

③ PHE Vapor In/Out temperature sensor is not applicable in ZX medium temperature condensing unit.

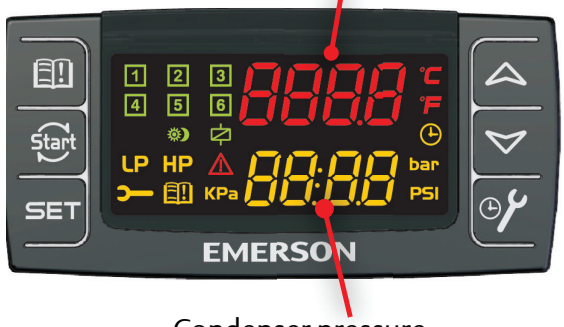
E2 Controller Trip Set Points and Actions (ZX-MT and ZXL-LT Units)

Fault Type	Trip Set Point	E2 Control Actions	Auto Resets	Possible Error And Solution
Reverse Phase / Loss Of Phase (3 Phase Only)	Incorrect voltage Sequence	- Lockout unit - Display Incorrect Phase Sequence on diagnostic - Initiate Buzzer/ Dialer Relay	Unit will not start unless it is wired correctly	- Change voltage sequence at circuit break. - Check voltage sequence of the compressor;
Fresh Start	If power is reset, ambient < 35°C or compressor off> 1 hour & signal for compressor start	- Compressor runs 3 sec and stops 20 sec - After 3 cycles, compressor runs continuously. - Display fresh start on diagnostic	Auto start	- Nothing is wrong, just wait till compressor runs continuously.
High Pressure Trip	Contact Open At 3.0 ±0.15Mpa Contact Close At 2.4±0.15Mpa	- Stop the unit - Display HP trip on diagnostic - Display waiting to restart on diagnostic - Auto start the unit after 3 minutes - Lockout unit if 6 trips in less than 1 hour - Display HP lockout on diagnostic -Initiate Buzzer/ Dialer Relay	5 Auto starts in 1 Hour	- Check whether HP cutout is functioning or is connected to control board; -Check whether condenser fan can run; -Check if the liquid line solenoid valve and liquid service valve are open.
Low Pressure Trip (Only in Med Temp Unit)	Contact Open At 0.1±0.05Mpa Contact Close At 0.2 ±0.05Mpa	-Stop the unit - Display LP trip on diagnostic - Display waiting to restart on diagnostic - Auto start the unit after 3 minutes	Auto Start	- Check whether evaporator need defrosting - Check that return gas service valve is open; - Check that LP cutout is functioning or is connected to control board

E2 Controller Trip Set Points and Actions (ZX-MT and ZXL-LT Units) *continuation*

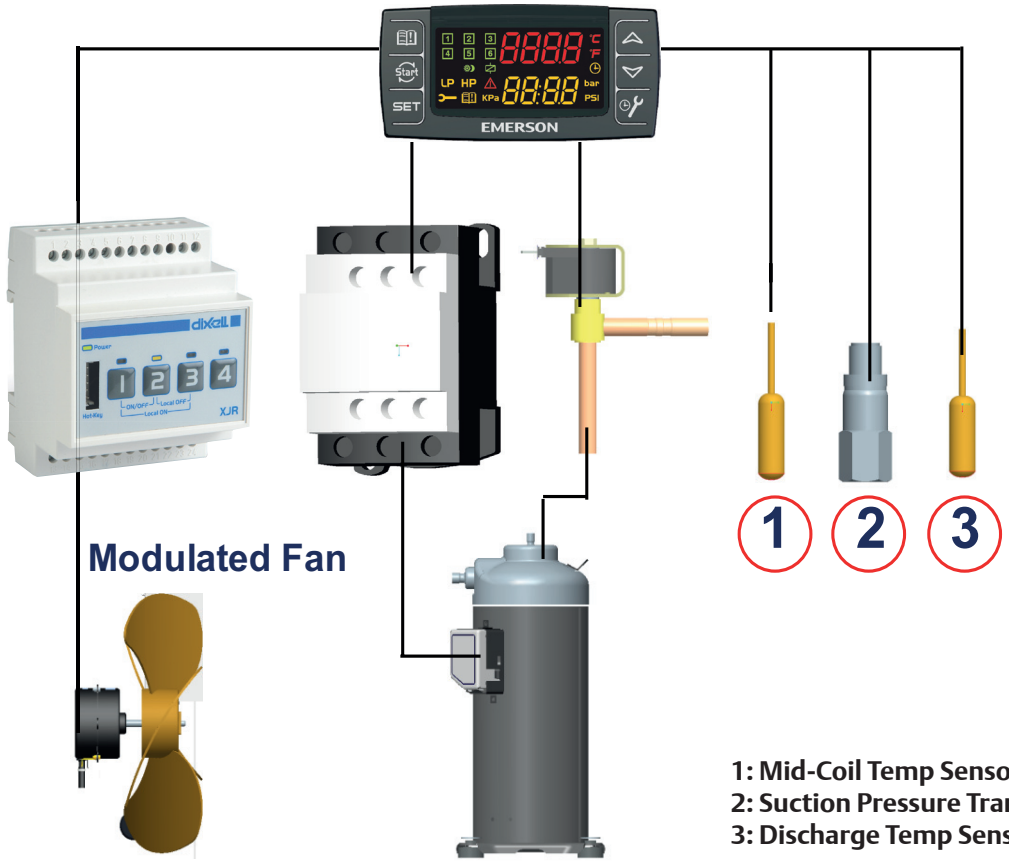
Fault Type	Trip Set Point	E2 Control Actions	Auto Resets	Possible Error And Solution
Discharge Gas Overheat	Discharge Temperature Over 132°C	- Stop the unit - Display DLT trip on diagnostic - Display waiting to restart on diagnostic -Auto start the unit after 3 minutes - Lockout unit if 6 trips in less than 1 hour - Display DLT overheat lockout on diagnostic - Initiate Buzzer/ Dialer Relay	5 Auto starts in 1 Hour	- Check if liquid line sight glass is full; - Check whether EXV is functioning and connected to control board
Over Current	Set Based On Compressor	- Stop the unit - Display over current trip on diagnostic - Display waiting to restart on diagnostic -Auto start the unit after 3 minutes - Lockout unit if 6 trips in less than 1 hour - Display over current lockout on diagnostic - Initiate Buzzer/ Dialer Relay	5 Auto starts in 1 Hour	- Check rotary switch, make sure it is on the right position according to unit model; - Check oil level through compressor sight glass (Low temp unit only);
Electrical Failure	Compressor not drawing current after compressor contactor organized	- Display compressor protector trip on diagnostic - Initiate Buzzer/ Dialer Relay -Auto start when protector reset, turn off buzzer/ Dialer	Auto start	-Check whether contactor is pulled-in. If not, check wiring of contactor coil; -Check wiring, make sure compressor is connected to contactor, and is powered; -Compressor motor thermal protector trips, wait till it reset.
Compressor Rapid Cycling	Minimum 3 minutes OFF time between starts	-Delay comp start, if minimum off time is less than 3 min -Display about to turn on diagnostic	Auto start	-Compressor start signal is active when unit just stops; the only thing needed to do is to wait until unit starts.
Discharge Line And Coil In Temperature Sensors Failure	A) Actual DLT>160°C (B) DLT Sensor fails and Actual DLT> 80°C (C) Both coil-in and DLT sensor fail (short circuit) (D) Coil in sensor fails(short) and actual DLT<73°C	**(Only Low Temp Unit)** -Stop the unit -Display DLT sensor failure on the diagnostic -Display waiting to restart on diagnostic -Auto start the unit after 3 minutes -Lockout unit if 6 trips in less than 1 hour -Display DLT sensor failure lockout on diagnostic -Initiate Buzzer/ Dialer Relay	5 Auto start in 1 Hour	-Check if liquid sight glass is full. If not, system must have leakage at somewhere; -Check whether DLT sensor is connected to control board; -Check whether DLT sensor is OK. If not, replace it with a good one; -Check whether Coil In sensor is OK. If not, replace it with a good one
		(Only Med Temp Unit) -Display DLT sensor failure on diagnostic -Continue to run the unit on default mode	Run	
	(A) Coil in sensor fails(open) and actual DLT<73°C (B) Both coil-in and DLT sensor fail (open circuit)	**(Both Low and Med Temp Unit)** -Display DLT sensor failure on diagnostic -Continue to run the unit on default mode	Run	-Check whether the sensors are connected to control board; -Check whether Coil-in is OK. If not, replace it with a new one; -Check whether compressor is having excessive flood back.
Ambient Temperature Sensor Failure	Ambient sensor reads <-30°C or >63°C	-Display ambient temp sensors failure on diagnostic -Continue to run the unit on default mode	Run	-Check whether actual Ambient temperature is out of range; -Check whether Ambient sensor is OK and connected to control board.
Condenser Mid-Coil Sensor Failure	Mid coil sensor reads <-30°C or >63°C	-Display mid coil temp sensors failure on diagnostic -Continue to run the unit on default mode	Run	-Check whether actual mid-coil temperature is out of range; -Check whether mid-coil sensor is OK and connected to control board.
PHE Vapor In Sensor Failure (Only Low Temp Unit)	Vapor In sensor reads <-16°C or >73°C	-Display sensor error on diagnostics -Continue to run the unit on default mode	Run	-Check whether actual temperature is out of range; -Check whether the sensor is connected to control board; -Check whether the sensor is mounted at the right position; -Check whether the sensor is in heat isolation material; -Check whether the sensor has failed.
PHE Vapor Out Sensor Failure (Only Low Temp Unit)	Vapor out sensor reads <-16°C or >73°C	-Display sensor error on diagnostics -Continue to run the unit on default mode	Run	

ZXD Controller Assembly



Program Mode: browses parameter codes or increase value
Hot Key Insert : Hot key programming procedure
INFO Menu: Press and release it to access INFO Menu
Program Mode: below parameter codes or decrease value
Maintenance /Clock

Emerson Controller On ZXD



1: Mid-Coil Temp Sensor
2: Suction Pressure Transducer
3: Discharge Temp Sensor

ZXD Electronic Controller

ZXD Condensing Unit BOM

Electronic Controller Parts	ZXD BOM		
	450	451	461
Digital scroll compressor controller			
Fan speed controller			

The controller has been pre-programmed with a number of parameter values that are most likely correct. Individual installation requirements, however, may make it necessary to alter parameter settings.

The control target of the compressor controller is to maintain the suction pressure (or saturated suction temperature) at a defined value by varying the available compressor capacity.

The control target of the fan speed controller is to maintain the average condenser mid coil temperature and hence the average discharge pressure at a defined value. This is achieved by varying the fan speed. The setpoint can be altered using the SEtF parameter.

Keyboard

Press Together for 3 seconds to Lock and unlock keyboard

Press together for 3 seconds to enter programming mode

Exit programming mode or wait 30 seconds

Pre-Set Parameters

Parameter	Value	Unit	Description
SEtC	-6	°C	Evaporation temperature set point
SEtF	25	°C	Fan speed control condenser mid-point temperature
dEU	tMp	-	Saturated Temperature measurement
CF	°C	-	Temperature unit
PMU	Bar	-	Pressure unit
dSP1	p2	-	Upper LED display – condensing temp.
dEU1	tMp	-	Upper LED default - temperature
dSP2	p1	-	Lower LED default display – Suction Pressure
dEU2	prs	-	Lower LED default - pressure

Warning: Before changing set points, installer must check refrigerant type, measured value units for compressors and fans.
Example: FtyP(Refrigerant type), dEU(Measured value units), LSE/HSE (limitation of set values)

Icons on LED Display

LED	Function	Description
°C	ON	Temperature unit, Celsius degrees
°F	ON	Temperature unit, Fahrenheit degrees
bar	ON	Pressure unit for display
PSI	ON	Pressure unit for display
KPa	ON	Pressure unit for display
1	ON	Digital scroll compressor power on
	Flashing	1 Hz : Digital scroll compressor is waiting to start 2 Hz : Digital input alarm for digital scroll compressor or maintenance status
	ON	Solenoid valve of digital scroll compressor is energized
	ON	Maintenance menu has been entered
	Flashing	One or more compressor has been in maintenance status
LP	ON	Mechanical low pressure switch alarm
HP	ON	Mechanical high pressure switch alarm
⚠	ON	Unit is in Alarm status
	ON	There is no new alarm
	Flashing	A new alarm has occurred

To reset an alarm: Press the SET key until rSt is displayed in the lower display
To reset all alarms: Press and hold the SET key for 10s.

Refrigerant Setting

SET + ▽ Press for 3 sec to enter programming mode

SET value will start blinking

Use SET and ▽ and △ to enter password 3210

▽ or △ to change refrigerant

SET store new value and move to following parameter

SET + △ to Exit or wait 30 sec to Exit

Initial setting of setpoint for suction pressure or saturated suction temperature

SET press for more than 2 sec

▽ or △ to change set value within 30 sec

SET press to memorize new set value, then SetF (fan speed control setpoint) will be displayed automatically

or to change set value within 30 sec

SET press to memorize new value and Exit, or wait for 30 sec without press any key to memorize value and Exit

Press or wait for 30 sec

How to Check Alarm History

Press alarm key

Press to find other alarms from most recent records

SET Press to see that alarm's activation hours

SET To delete alarm press and hold until 'rSt' is showing on lower LED display

SET Press 10 sec to erase alarm. Running alarm cannot be erased

To Disable Controller During Service Work on ZXD

Press for 3 sec

or to select parameter

SET parameter value will start blinking

or to change set values from On to Off

SET press to memorize new set value, then automatically next parameter will be displayed

press it or wait for 30 sec

Check Running Hours of Each Compressor and Reset Operation Time After Compressor Replacement

Press and release

Press to select compressor number

Press and hold SET key

Press or wait for 30 sec

Reset Parameters by Using 'Hot Key'

- Power off the unit
- Insert the factory programmed 'Hot Key' into the 5pin connecter
- Power on the unit
- Factory programmed parameters will be copied from "Hot Key" to controller
- 'doL' message will blink and then flashing 'End' will be shown on the LED.
- After 10sec, unit will run with new parameters
- Remove 'Hot Key' from electronic controller

Save Parameters in 'Hot Key'

- Power on the unit
- Insert 'Hot key' and press key
- Factory programmed parameters will be copied to 'Hot Key'
- 'uPL' message will blink and then flashing 'End' will be shown on the LED.
- Press

key and 'End' will stop flashing
- Power off unit and remove 'Hot key' from controller
- Power on unit

Digital scroll compressor controller has been specially developed for Emerson ZXD condensing unit. This controller is only intended for use in Emerson ZXD condensing units, therefore Emerson has no responsibility of any use on other condensing unit.

Alarm Messaging - Digital Scroll Controller (ZXD)

Alarm Mode	Set Points	Controller Actions	Reset	Remarks
dtL	DLT >= dtL after dLd time delay	- Compressors are turned off	Auto reset when DLT < dtL-dLH	DLT
E01L	Low pressure is lower than ELP (Level 3 Parameter)	- Compressors are turned off - Fans are unchanged	Auto reset when LP >= ELP(Level 3)	LP
E0L	Mechanical LP switch opens	- Compressors are turned off - Fans are unchanged	Auto reset when Number of activations < PEn in PEi time	LP
			Manual reset when Number of activations >= PEn in PEi time - Press key for 3 sec or - Turn off and on the unit	LP
C-LA	LP < LAL	- Signaling only	Auto reset when LP = LAL + delta (0.3bar)	LP
C-HA	LP >= HAL	- Signaling only	Auto reset when LP = HAL -delta (0.3bar)	LP
E0H	Condensing Temperature High	- Compressors are turned off - Fans are turned on	Auto reset when Number of activations < PEn in PEi time	Cond Mid Temp.
			Manual reset when Number of activations >= PEn in PEi time - Press key for 3 sec or - Turn off and on the unit	Cond Mid
F-HA	HP >= HAF	- HFC = yes, compressor are turned off	Auto reset when HAF + delta (0.3bar)	Cond Mid Temp.
P1	Suction Transducer failure or out of range	- Compressors are activated according to SPr or PoPr	Auto reset when probe is normal	LP
P2	Condenser Mid Coil Sensor failure or out of range	- Fans are activated according to FPr	Auto reset when probe is normal	Cond Mid Temp.
P3	Discharge Temp Sensor failure or out of range	-The functions related to No.3 probe are disabled	Auto reset when probe is normal	DLT

DLT: Discharge line temperature
LP : Low pressure
HP : High pressure

ZX Family: Medium Temperature

Capacity and Power (kW) at **50 Hz** - PFJ/TFD

R22 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)							Power Evaporating Temperature (°C)						
		-15	-10	-5	0	5	10	12	-15	-10	-5	0	5	10	12
ZX0200	27	2.84	3.61	4.18	4.95	5.87	7.03	7.45	1.33	1.37	1.41	1.47	1.53	1.70	1.79
	32	2.65	3.33	4.01	4.75	5.61	6.54	6.96	1.45	1.50	1.58	1.64	1.71	1.84	1.88
	38	2.38	3.11	3.81	4.55	5.37	6.19	6.68	1.62	1.74	1.83	1.87	1.91	2.03	2.08
	43	1.93	2.74	3.48	4.23	5.06	5.99	6.33	1.78	1.83	1.95	2.05	2.11	2.20	2.25
	48	1.68	2.30	3.18	3.87	4.69	5.51	5.80	2.21	2.31	2.44	2.51	2.54	2.55	2.64
ZX0250[1]	27	2.72	3.64	4.39	5.09	5.83	6.71	8.36	1.79	1.90	1.94	1.95	1.95	1.98	2.12
	32	2.56	3.45	4.18	4.83	5.52	6.33	7.87	2.02	2.14	2.18	2.19	2.19	2.21	2.34
	38	2.11	3.00	3.71	4.33	4.98	5.74	7.18	2.35	2.47	2.51	2.51	2.51	2.52	2.64
	43	1.62	2.53	3.25	3.88	4.51	5.25	6.64	2.67	2.78	2.83	2.83	2.82	2.83	2.93
	48	2.08	2.83	3.48	4.13	4.86	7.37	6.23	3.15	3.19	3.18	3.17	3.17	2.29	3.25
ZX0300	27	4.30	5.20	6.28	7.57	9.09	10.22	10.80	1.95	2.04	2.17	2.20	2.23	2.43	2.49
	32	4.12	4.90	5.95	7.28	8.69	9.79	10.31	2.10	2.20	2.32	2.34	2.46	2.70	2.77
	38	3.68	4.62	5.65	6.85	8.29	9.06	9.63	2.37	2.48	2.59	2.60	2.76	3.06	3.12
	43	3.27	4.22	5.27	6.50	7.97	8.63	9.08	2.64	2.75	2.84	2.94	3.04	3.32	3.36
	48	2.40	3.55	4.65	5.67	6.86	7.97	8.50	2.98	3.18	3.28	3.35	3.50	3.64	3.69
ZX0400	27	5.98	7.20	8.57	10.03	11.54	13.82	14.64	2.64	2.71	2.83	2.98	3.08	3.34	3.36
	32	5.46	6.73	8.13	9.62	11.16	13.01	13.85	2.81	2.90	3.06	3.19	3.33	3.68	3.68
	38	4.72	6.01	7.42	8.93	10.48	12.09	13.04	3.08	3.27	3.39	3.49	3.65	4.09	4.07
	43	4.09	5.37	6.78	8.27	9.80	11.61	12.25	3.29	3.52	3.68	3.80	3.95	4.38	4.39
	48	3.55	4.50	6.20	7.57	9.08	10.68	11.23	4.16	4.46	4.49	4.72	4.80	5.07	5.18
ZX0500[2]	27	7.13	8.76	10.44	12.22	14.12	17.28	18.22	2.88	3.03	3.18	3.29	3.47	4.16	4.28
	32	6.77	8.31	9.96	11.72	13.68	16.62	17.47	3.37	3.35	3.57	3.67	3.97	4.50	4.58
	38	6.24	7.69	9.28	11.06	13.06	15.31	16.34	3.77	3.87	4.07	4.27	4.47	4.98	5.10
	43	5.44	6.80	8.36	10.15	12.21	14.60	15.47	4.27	4.27	4.47	4.66	4.96	5.46	5.56
	48	3.96	5.80	7.62	9.49	11.47	13.49	14.40	5.14	5.21	5.44	5.61	5.80	6.01	6.04
ZX0600[2]	27	8.50	10.41	12.49	14.72	17.66	19.64	20.60	3.51	3.70	3.88	4.16	4.43	4.98	5.32
	32	7.71	9.93	11.71	13.94	16.30	18.87	20.10	3.88	4.07	4.25	4.43	4.71	5.29	5.47
	38	6.81	8.42	10.57	12.85	15.26	17.77	18.92	4.34	4.53	4.71	4.90	5.08	5.86	5.98
	43	5.91	7.23	9.40	11.78	14.26	16.33	17.86	4.90	5.17	5.45	5.64	5.73	6.57	6.66
	48	4.97	7.00	9.25	11.15	13.08	15.09	16.06	6.02	6.22	6.46	6.69	6.96	7.22	7.45
ZX0750[2]	27	10.03	12.20	14.41	17.23	20.87			4.34	4.54	4.76	4.98	5.22		
	32	9.45	11.24	13.90	16.63	20.21			4.77	4.95	5.19	5.51	5.91		
	38	8.83	10.85	13.25	15.50	19.42			5.36	5.53	5.83	6.25	6.80		
	43	8.18	10.00	12.29	14.30	18.49			5.95	6.10	6.43	6.93	7.62		
ZX0760[2]	27	10.23	12.44	14.70	17.60	21.29	25.49	27.01	4.25	4.45	4.66	4.88	5.12	5.47	5.64
	32	9.64	11.46	14.18	16.96	20.61	24.03	25.58	4.67	4.85	5.09	5.40	5.79	5.86	5.97
	38	9.01	11.07	13.52	15.80	19.81	22.85	24.65	5.26	5.42	5.72	6.12	6.67	6.64	6.81
	43	8.34	10.20	12.54	14.60	18.86	22.34	23.57	5.83	5.98	6.30	6.79	7.47	7.34	7.48
	48	7.24	8.55	11.46	14.09	17.47	20.55	21.61	6.79	7.04	7.40	7.89	8.43	8.74	8.78

Notes: [1] Available on PFJ models only
[2] Available on TFD models only
Based on a return gas temperature of 18.3°C.
Power includes condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZX Family: Medium Temperature

Capacity and Power (kW) at **60 Hz** - TF5/TF7

R22 - 60 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)					Power Evaporating Temperature (°C)				
		-15	-10	-5	0	5	-15	-10	-5	0	5
ZX0200	27	3.62	4.42	5.36	6.43	7.59	1.69	1.71	1.69	1.69	1.71
	32	3.41	4.22	5.17	6.20	7.29	1.89	1.91	1.90	1.89	1.90
	38	2.88	3.77	4.75	5.78	6.84	2.13	2.17	2.17	2.17	2.18
	43	2.20	3.19	4.24	5.31	6.38	2.35	2.41	2.42	2.43	2.45
	48	1.30	2.43	3.58	4.73	5.84	2.59	2.67	2.71	2.73	2.75
	50	0.88	2.07	3.27	4.46	5.60	2.69	2.78	2.83	2.85	2.89
ZX0300	27	5.12	6.20	7.29	8.90	10.54	2.42	2.53	2.69	2.73	2.77
	32	4.91	5.84	6.98	8.48	10.00	2.60	2.73	2.88	2.90	3.05
	38	4.39	5.51	6.53	7.96	9.38	2.94	3.08	3.21	3.22	3.42
	43	3.90	5.03	5.94	7.35	8.74	3.27	3.41	3.52	3.65	3.77
	48	2.86	4.23	5.01	6.45	7.86	3.70	3.94	4.07	4.15	4.34
	50	2.45	3.12	4.51	5.98	7.40	3.86	4.16	4.29	4.36	4.57
ZX0400	27	7.36	8.83	10.52	12.37	14.31	3.25	3.35	3.52	3.75	4.02
	32	7.06	8.54	10.21	12.02	13.92	3.55	3.63	3.79	4.01	4.28
	38	6.37	7.87	9.55	11.34	13.20	4.05	4.11	4.26	4.48	4.75
	43	5.62	7.16	8.86	10.66	12.50	4.55	4.60	4.73	4.95	5.22
	48	4.82	6.41	8.14	9.96	11.81	5.09	5.12	5.25	5.46	5.74
	50	4.50	6.12	7.87	9.70	11.55	5.30	5.33	5.46	5.67	5.95
ZX0500	27	8.55	10.51	12.53	14.66	16.95	3.54	3.72	3.91	4.05	4.27
	32	8.12	9.97	11.95	14.06	16.42	4.15	4.13	4.39	4.52	4.88
	38	7.49	9.23	11.14	13.28	15.68	4.64	4.76	5.00	5.25	5.49
	43	6.53	8.16	10.03	12.18	14.65	5.25	5.25	5.49	5.74	6.10
	48	4.75	6.96	9.14	11.39	13.76	6.33	6.40	6.69	6.90	7.13
	50	4.04	6.48	8.79	11.07	13.41	6.76	6.87	7.16	7.37	7.55
ZX0600	27	10.20	12.49	14.99	17.66	21.19	4.39	4.62	4.85	5.20	5.54
	32	9.25	11.92	14.05	16.73	19.56	4.85	5.08	5.31	5.54	5.89
	38	8.17	10.10	12.68	15.42	18.31	5.43	5.66	5.89	6.12	6.35
	43	7.09	8.68	11.28	14.14	17.11	6.12	6.47	6.81	7.04	7.16
	48	5.96	8.40	11.10	13.38	15.70	7.53	7.77	8.07	8.37	8.70
	50	5.51	8.29	11.03	13.08	15.13	8.09	8.16	8.44	8.75	9.00
ZX0750	27	11.25	14.06	16.61	19.89	24.05	5.10	5.34	5.59	5.86	6.14
	32	10.60	12.95	16.02	19.16	23.29	5.60	5.82	6.11	6.48	6.95
	38	9.91	12.51	15.28	17.85	22.38	6.31	6.51	6.86	7.35	8.00
	43	9.18	11.53	14.17	16.50	21.31	7.00	7.17	7.56	8.15	8.96
	48	7.96	9.66	12.95	15.92	19.74	8.15	8.45	8.88	9.47	10.12
	50	7.48	8.92	12.46	15.69	19.11	8.61	8.96	9.41	10.00	10.58

Note: Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZX Family: Medium Temperature

Capacity and Power (kW) at **50 Hz** - PFJ/TFD

R404A/R507 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)						Power Evaporating Temperature (°C)					
		-20	-15	-10	-5	0	5	-20	-15	-10	-5	0	5
ZX020E	27	3.30	3.90	4.44	5.08	5.79	6.60	1.64	1.67	1.70	1.76	1.84	1.96
	32	2.85	3.39	3.92	4.48	5.08	5.76	1.79	1.81	1.84	1.90	2.00	2.12
	38	2.42	2.90	3.36	3.85	4.36	4.94	1.95	1.99	2.02	2.07	2.16	2.26
	43	1.94	2.43	2.89	3.34	3.81	4.30	2.14	2.18	2.22	2.27	2.34	2.41
ZX025E[1]	27	3.01	3.01	4.01	4.85	5.62	6.44	1.68	1.68	1.78	1.82	1.83	1.83
	32	2.83	2.83	3.81	4.61	5.33	6.09	1.90	1.90	2.01	2.05	2.05	2.05
	38	2.33	2.33	3.31	4.09	4.78	5.50	2.20	2.20	2.31	2.36	2.36	2.36
	43	1.78	1.78	2.79	3.59	4.28	4.98	2.50	2.50	2.61	2.65	2.66	2.64
ZX030E	27	4.04	4.87	5.81	6.85	7.99	9.23	2.14	2.19	2.24	2.32	2.42	2.55
	32	3.75	4.52	5.39	6.35	7.40	8.55	2.40	2.44	2.50	2.57	2.67	2.81
	38	3.39	4.08	4.85	5.72	6.67	7.69	2.72	2.75	2.80	2.88	3.00	3.15
	43	3.06	3.69	4.39	5.17	6.03	6.97	3.06	3.09	3.14	3.21	3.33	3.50
ZX040E	27	5.52	6.57	7.70	8.95	10.37	12.02	2.72	2.86	3.02	3.17	3.31	3.36
	32	5.10	6.10	7.13	8.24	9.47	10.87	3.03	3.15	3.31	3.46	3.54	3.68
	38	4.61	5.60	6.57	7.57	8.64	9.85	3.45	3.58	3.71	3.85	3.97	4.03
	43	3.98	5.00	5.95	6.89	7.83	8.85	3.87	4.00	4.12	4.23	4.33	4.38
ZX050E[2]	27	7.49	9.05	10.67	12.31	13.93	15.51	3.65	3.73	3.86	4.02	4.25	4.53
	32	6.56	8.12	9.76	11.43	13.10	14.74	4.11	4.20	4.32	4.50	4.72	5.00
	38	5.56	7.07	8.67	10.32	11.98	13.63	4.59	4.68	4.79	4.96	5.16	5.42
	43	4.88	6.28	7.79	9.37	10.98	12.58	5.11	5.17	5.27	5.40	5.59	5.81
ZX060E[2]	27	8.24	9.72	11.47	13.30	15.69	18.48	3.69	3.84	4.06	4.33	4.62	4.93
	32	7.53	9.06	10.72	12.58	14.72	17.20	4.40	4.54	4.75	5.01	5.28	5.56
	38	6.74	8.25	9.83	11.55	13.48	15.69	4.93	5.05	5.25	5.47	5.72	5.98
	43	5.90	7.48	9.07	10.74	12.57	14.63	5.59	5.69	5.85	6.06	6.28	6.51
ZX075E[2]	27	9.04	10.86	12.75	15.07	17.76	20.13	4.08	4.26	4.50	4.80	5.13	5.46
	32	8.33	10.01	11.82	13.86	16.20	18.92	4.88	5.03	5.27	5.54	5.86	6.17
	38	7.30	8.74	10.62	12.47	14.54	16.92	5.46	5.61	5.82	6.06	6.35	6.63
	43	6.26	7.93	9.61	11.38	13.32	15.50	6.20	6.32	6.49	6.71	6.96	7.22
ZX076E[2]	27	9.22	11.07	13.00	15.37	18.12	20.53	4.00	4.17	4.41	4.70	5.03	5.35
	32	8.50	10.21	12.06	14.14	16.53	19.30	4.78	4.93	5.16	5.43	5.74	6.05
	38	7.45	8.91	10.83	12.72	14.83	17.26	5.35	5.50	5.70	5.94	6.22	6.50
	43	6.39	8.09	9.80	11.61	13.59	15.81	6.07	6.19	6.36	6.57	6.82	7.07

Notes: [1] Available on PFJ models only
[2] Available on TFD models only
Based on a return gas temperature of 18.3°C.
Power includes condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZX Family: Medium Temperature

Capacity and Power (kW) at **60 Hz** - TF5/TF7

R404A/R507 - 60 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)						Power Evaporating Temperature (°C)					
		-20	-15	-10	-5	0	5	-20	-15	-10	-5	0	5
ZX020E	27	3.50	4.26	4.98	5.77	6.71	7.89	1.84	1.87	1.90	1.95	2.00	2.05
	32	3.15	3.94	4.66	5.40	6.25	7.30	2.09	2.10	2.12	2.16	2.20	2.24
	38	2.69	3.52	4.24	4.93	5.69	6.60	2.42	2.42	2.44	2.47	2.50	2.54
	43	2.22	3.09	3.82	4.48	5.17	5.97	2.71	2.71	2.73	2.76	2.81	2.85
ZX030E	27	5.02	5.98	7.05	8.17	9.29	10.36	2.69	2.80	2.92	3.05	3.17	3.29
	32	4.62	5.56	6.63	7.75	8.88	9.97	2.98	3.06	3.16	3.26	3.36	3.45
	38	4.14	5.02	6.02	7.10	8.18	9.23	3.38	3.46	3.55	3.65	3.75	3.85
	43	3.78	4.56	5.47	6.46	7.47	8.44	3.74	3.84	3.95	4.08	4.21	4.33
ZX040E	27	6.71	8.02	9.60	11.30	13.00	14.59	3.72	3.79	3.89	3.99	4.10	4.18
	32	6.46	7.70	9.20	10.81	12.42	13.90	3.84	3.92	4.02	4.14	4.26	4.35
	38	5.90	7.05	8.45	9.95	11.43	12.76	4.32	4.40	4.50	4.62	4.74	4.84
	43	5.36	6.43	7.73	9.12	10.49	11.69	4.89	4.95	5.05	5.16	5.27	5.37
ZX050E	27	8.10	9.70	11.55	13.54	15.53	17.38	4.42	4.63	4.86	5.11	5.35	5.57
	32	8.05	9.56	11.33	13.21	15.09	16.83	4.59	4.78	4.99	5.22	5.45	5.66
	38	7.46	8.86	10.50	12.25	13.99	15.58	5.10	5.27	5.48	5.70	5.93	6.13
	43	6.81	8.10	9.63	11.26	12.88	14.33	5.62	5.80	6.01	6.24	6.47	6.69
ZX060E	27	9.84	11.77	13.96	16.31	18.74	21.15	5.06	5.24	5.49	5.76	6.01	6.20
	32	9.25	11.09	13.16	15.36	17.60	19.79	5.39	5.58	5.82	6.09	6.35	6.55
	38	8.30	10.09	12.06	14.13	16.19	18.16	6.09	6.25	6.48	6.74	6.99	7.19
	43	7.32	9.11	11.04	13.03	14.98	16.82	6.82	6.96	7.17	7.41	7.65	7.83
ZX075E	27	11.16	13.39	14.92	17.64	19.93	22.58	4.80	5.00	5.69	6.06	6.54	6.96
	32	10.29	12.35	13.84	16.23	18.18	21.23	5.74	5.92	6.66	7.00	7.46	7.87
	38	9.01	10.78	12.43	14.60	16.31	18.99	6.42	6.60	7.35	7.66	8.09	8.45
	43	7.73	9.79	11.25	13.33	14.95	17.39	7.28	7.43	8.20	8.48	8.87	9.19

Notes: Power includes condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXD Family: Digital Medium Temperature

Capacity and Power (kW) at **50 Hz** - TFD

R22 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)						Power Evaporating Temperature (°C)					
		-10	-5	0	5	10	12	-10	-5	0	5	10	12
ZXD0400	27	7.73	9.28	10.88	12.42	14.67	15.18	2.66	2.77	2.92	3.02	3.30	3.38
	32	7.29	8.91	10.61	12.33	14.29	14.98	2.84	3.00	3.12	3.26	3.60	3.70
	38	6.39	7.95	9.68	11.44	13.22	14.14	3.20	3.32	3.42	3.57	4.01	4.10
	43	5.71	7.27	8.97	10.70	12.69	13.29	3.44	3.60	3.72	3.86	4.29	4.40
	48		6.55	8.06	9.76	11.56	12.17		4.40	4.62	4.70	4.96	5.07
ZXD0500	27	8.76	10.44	12.22	14.12	17.28	18.22	3.03	3.18	3.29	3.47	3.95	4.10
	32	8.31	9.96	11.72	13.68	16.62	17.47	3.35	3.57	3.67	3.97	4.50	4.58
	38	7.69	9.28	11.06	13.06	15.31	16.34	3.87	4.07	4.27	4.47	4.98	5.10
	43	6.80	8.36	10.15	12.21	14.60	15.47	4.27	4.47	4.66	4.96	5.46	5.56
	48		7.62	9.49	11.47	13.49	14.40		5.44	5.61	5.80	6.01	6.04
ZXD0600	27	10.41	12.49	14.72	17.66	19.64	20.60	3.70	3.88	4.16	4.50	4.70	4.81
	32	9.93	11.71	13.94	16.30	18.87	20.10	4.07	4.25	4.43	4.75	5.29	5.47
	38	8.90	10.57	12.85	15.26	17.77	18.92	4.53	4.71	4.90	5.23	5.86	5.98
	43	7.60	9.40	11.78	14.26	16.33	17.86	5.17	5.45	5.64	6.10	6.57	6.66
	48		9.25	11.15	13.08	15.09	16.06		6.46	6.69	6.96	7.22	7.30
ZXD0750	27	12.37	14.91	17.73	20.87			4.54	4.76	4.98	5.22		
	32	11.24	13.90	16.96	20.21			4.95	5.19	5.51	5.91		
	38	10.85	13.25	16.08	19.42			5.53	5.83	6.25	6.80		
	43		12.29	15.09	18.49				6.43	6.93	7.62		
ZXD0760	27	12.62	15.21	18.08	21.29	24.47	25.93	4.45	4.66	4.88	5.12	5.47	5.64
	32	11.46	14.18	16.96	20.61	23.07	24.56	4.85	5.09	5.40	5.79	5.86	5.97
	38	11.07	13.52	15.80	19.81	21.94	23.66	5.42	5.72	6.12	6.67	6.64	6.81
	43	10.20	12.54	14.60	18.86	21.45	22.63	5.98	6.30	6.79	7.47	7.34	7.48
	48		11.46	14.09	17.47	19.73	20.75		7.40	7.89	8.43	8.74	8.78

Notes: Based on suction superheat of 10K.
Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXD Family: Digital Medium Temperature

Capacity and Power (kW) at **50 Hz** - TFD

R404A/R507 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)						Power Evaporating Temperature (°C)					
		-20	-15	-10	-5	0	5	-20	-15	-10	-5	0	5
ZXD040E	27	5.92	7.11	8.35	9.64	11.01	12.46	2.70	2.85	3.02	3.21	3.43	3.68
	32	5.53	6.69	7.87	9.11	10.40	11.75	2.99	3.12	3.27	3.44	3.64	3.87
	38	4.90	6.00	7.12	8.27	9.45	10.68	3.49	3.59	3.72	3.87	4.04	4.24
	43	4.23	5.28	6.33	7.40	8.48	9.59	4.02	4.10	4.21	4.34	4.50	4.68
	48	3.56	4.56	5.54	6.53	7.51		4.55	4.61	4.70	4.81	4.96	
ZXD050E	27	7.49	9.05	10.67	12.31	13.93	15.51	3.65	3.73	3.86	4.02	4.25	4.53
	32	6.56	8.12	9.76	11.43	13.10	14.74	4.11	4.20	4.32	4.50	4.72	5.00
	38	5.56	7.07	8.67	10.32	11.98	13.63	4.59	4.68	4.79	4.96	5.16	5.42
	43	4.88	6.28	7.79	9.37	10.98	12.58	5.11	5.17	5.27	5.40	5.59	5.81
	48	4.20	5.49	6.91	8.42	9.98		5.63	5.67	5.75	5.85	6.01	
ZXD060E	27	8.24	9.72	11.47	13.30	15.69	18.48	3.69	3.84	4.06	4.33	4.62	4.93
	32	7.58	9.06	10.72	12.58	14.72	17.20	4.40	4.54	4.75	5.01	5.28	5.56
	38	6.74	8.25	9.83	11.55	13.48	15.69	4.93	5.05	5.25	5.47	5.72	5.98
	43	5.90	7.48	9.07	10.74	12.57	14.63	5.59	5.69	5.85	6.06	6.28	6.51
	48	5.06	6.71	8.31	9.93	11.66		6.26	6.32	6.46	6.64	6.83	
ZXD075E	27	9.04	10.86	12.75	15.07	17.76	20.13	4.08	4.26	4.50	4.80	5.13	5.46
	32	8.33	10.01	11.82	13.86	16.20	18.92	4.88	5.03	5.27	5.54	5.86	6.17
	38	7.30	8.74	10.62	12.47	14.54	16.92	5.46	5.61	5.82	6.06	6.35	6.63
	43	6.26	7.93	9.61	11.38	13.32	15.50	6.20	6.32	6.49	6.71	6.96	7.22
ZXD076E	27	9.22	11.07	13.00	15.37	18.12	20.53	4.00	4.17	4.41	4.70	5.03	5.35
	32	8.50	10.21	12.06	14.14	16.53	19.30	4.78	4.93	5.16	5.43	5.74	6.05
	38	7.45	8.91	10.83	12.72	14.83	17.26	5.35	5.50	5.70	5.94	6.22	6.50
	43	6.39	8.09	9.80	11.61	13.59	15.81	6.07	6.19	6.36	6.57	6.82	7.07
	48	5.32	7.26	8.77	10.50	12.34		6.79	6.88	7.02	7.21	7.43	

Notes: Based on return gas temperature of 18.3°C.
at suction superheat of 10 K.
Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

Capacity and Power (kW) at **60 Hz** - TF7

R404A/R507 - 60 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)						Power Evaporating Temperature (°C)					
		-20	-15	-10	-5	0	5	-20	-15	-10	-5	0	5
ZXD040E	27	7.10	8.53	9.35	10.80	12.99	14.70	3.24	3.42	3.62	3.85	4.05	4.34
	32	6.64	8.03	8.70	10.20	12.27	13.87	3.59	3.74	4.00	4.13	4.30	4.57
	38	5.88	7.20	7.97	9.26	11.15	12.60	4.19	4.31	4.46	4.64	4.77	5.00
	43	5.21	6.34	7.09	8.29	10.01	11.32	4.82	4.92	5.05	5.21	5.31	5.52
	48	4.27	5.60	6.20	7.31	8.86		5.46	5.53	5.64	5.77	5.85	
ZXD050E	27	8.99	10.86	11.74	13.54	15.32	17.06	4.38	4.48	4.63	4.83	5.10	5.44
	32	7.87	9.75	10.77	12.57	14.41	16.21	4.93	5.04	5.11	5.40	5.66	6.00
	38	6.67	8.48	9.54	11.35	13.18	14.99	5.51	5.61	5.75	5.95	6.20	6.51
	43	5.86	7.54	8.57	10.31	12.08	13.84	6.14	6.21	6.32	6.48	6.71	6.97
	48	5.04	6.59	7.60	9.26	10.98		6.76	6.81	6.89	7.02	7.22	
ZXD060E	27	10.22	12.06	13.41	15.56	17.89	21.07	4.42	4.61	5.08	5.41	5.78	6.16
	32	9.34	11.23	12.54	14.72	16.78	19.61	5.28	5.45	5.93	6.26	6.61	6.96
	38	8.36	10.23	11.50	13.51	15.37	17.89	5.91	6.06	6.58	6.83	7.15	7.47
	43	7.44	9.27	10.61	12.57	14.33	16.68	6.71	6.83	7.32	7.57	7.85	8.34
	48	6.27	8.22	9.72	11.62	13.29		7.51	7.59	8.07	8.30	8.54	
ZXD075E	27	11.16	13.39	14.92	17.64	19.93	22.58	4.80	5.00	5.69	6.06	6.54	6.96
	32	10.29	12.35	13.84	16.23	18.18	21.23	5.74	5.92	6.66	7.00	7.46	7.87
	38	9.01	10.78	12.43	14.60	16.31	18.99	6.42	6.60	7.35	7.66	8.09	8.45
	43	7.73	9.79	11.25	13.33	14.95	17.39	7.28	7.43	8.20	8.48	8.87	9.19
	48	6.44	8.78	10.07	12.05			8.15	8.26	9.06	9.30		

Notes: Based on return gas temperature of 18.3°C.
at suction superheat of 10 K.
Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXL Family: Low Temperature

Capacity and Power (kW) at **50 Hz** - TFD

R22 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)									Power Evaporating Temperature (°C)								
		-40	-35	-30	-25	-20	-15	-10	-5	0	-40	-35	-30	-25	-20	-15	-10	-5	0
ZXL0200	20	1.35	1.57	1.90	2.28	2.76	3.30	3.93	4.64	5.41	0.94	1.03	1.12	1.19	1.26	1.31	1.36	1.40	1.43
	27	1.32	1.55	1.87	2.26	2.73	3.27	3.89	4.59	5.36	1.10	1.20	1.29	1.36	1.43	1.49	1.55	1.59	1.63
	32	1.32	1.55	1.86	2.24	2.70	3.24	3.85	4.54	5.31	1.26	1.36	1.45	1.53	1.61	1.67	1.73	1.78	1.81
	38	1.26	1.48	1.78	2.15	2.61	3.13	3.74	4.42	5.18	1.51	1.61	1.71	1.79	1.87	1.94	2.00	2.05	2.09
	43	1.15	1.36	1.66	2.03	2.47	2.99	3.59	4.27	5.02	1.76	1.87	1.97	2.05	2.13	2.21	2.27	2.32	2.37
	48	0.99	1.20	1.49	1.85	2.29	2.81				2.05	2.16	2.26	2.35	2.44	2.51			
ZXL0250	20	1.65	1.90	2.20	2.70	3.40	4.10	4.85	5.73	6.72	1.18	1.28	1.38	1.48	1.57	1.65	1.74	1.81	1.89
	27	1.61	1.87	2.12	2.67	3.31	4.03	4.84	5.72	6.69	1.32	1.40	1.49	1.57	1.64	1.71	1.78	1.84	1.90
	32	1.56	1.82	2.09	2.63	3.26	3.97	4.76	5.63	6.58	1.51	1.59	1.66	1.72	1.79	1.85	1.90	1.95	2.00
	38	1.42	1.68	1.97	2.49	3.10	3.79	4.56	5.42	6.36	1.85	1.91	1.97	2.02	2.07	2.11	2.15	2.19	2.22
	43	1.23	1.48	1.79	2.30	2.89	3.57	4.33	5.17	6.09	2.22	2.27	2.31	2.35	2.39	2.43	2.45	2.48	2.50
	48	1.10	1.28	1.54	2.03	2.61	3.27				2.66	2.70	2.74	2.77	2.79	2.82			
ZXL0300	20	1.94	2.29	2.67	3.17	3.78	4.48	5.40	6.52	8.06	1.28	1.45	1.60	1.74	1.87	1.99	2.09	2.18	2.26
	27	1.90	2.19	2.58	3.08	3.69	4.40	5.20	6.44	7.85	1.36	1.52	1.67	1.80	1.92	2.03	2.13	2.21	2.28
	32	1.80	2.09	2.49	2.99	3.60	4.32	5.14	6.06	7.63	1.55	1.70	1.85	1.98	2.09	2.20	2.29	2.37	2.43
	38	1.58	1.87	2.27	2.77	3.39	4.10	4.92	5.85	7.30	1.92	2.07	2.21	2.33	2.45	2.54	2.63	2.70	2.76
	43	1.31	1.59	1.99	2.50	3.11	3.83	4.65	5.58	6.95	2.36	2.51	2.64	2.76	2.86	2.96	3.04	3.11	3.16
	48	1.21	1.35	1.63	2.13	2.75	3.47				2.91	3.05	3.18	3.29	3.39	3.48			
ZXL0350	20	2.56	2.90	3.44	4.15	5.01	5.98	7.03	8.14	9.26	1.68	1.73	1.79	1.88	1.98	2.09	2.22	2.37	2.52
	27	2.29	2.64	3.19	3.91	4.76	5.71	6.75	7.83	8.92	1.81	1.87	1.95	2.05	2.17	2.30	2.44	2.60	2.76
	32	2.12	2.47	3.02	3.72	4.56	5.49	6.50	7.55	8.62	2.08	2.16	2.25	2.36	2.48	2.62	2.78	2.94	3.11
	38	1.93	2.27	2.80	3.48	4.28	5.19	6.16	7.16	8.18	2.52	2.60	2.71	2.82	2.96	3.11	3.27	3.44	3.63
	43	1.78	2.09	2.59	3.25	4.02	4.89	5.81	6.77	7.73	2.88	2.97	3.09	3.21	3.35	3.51	3.68	3.86	4.05
	48	1.61	1.90	2.37	2.98	3.71	4.53				3.18	3.28	3.40	3.53	3.68	3.84			
ZXL0400	20	3.18	3.85	4.64	5.56	6.60	7.77	9.06	10.48	12.03	1.94	2.08	2.22	2.38	2.54	2.70	2.88	3.06	3.25
	27	2.80	3.42	4.16	5.03	6.02	7.14	8.39	9.76	11.26	2.27	2.43	2.59	2.76	2.94	3.12	3.32	3.52	3.73
	32	2.58	3.17	3.87	4.71	5.67	6.76	7.97	9.31	10.77	2.58	2.75	2.93	3.11	3.30	3.50	3.71	3.92	4.15
	38	2.39	2.93	3.59	4.39	5.31	6.35	7.52	8.82	10.25	3.04	3.23	3.42	3.62	3.83	4.04	4.27	4.50	4.73
	43	2.27	2.78	3.41	4.17	5.06	6.07	7.21	8.47	9.86	3.50	3.69	3.90	4.11	4.33	4.56	4.80	5.04	5.30
	48	2.21	2.68	3.28	4.01	4.86	5.83				4.01	4.22	4.44	4.67	4.91	5.15			
ZXL0500	20	3.50	4.30	5.30	6.40	7.73	9.08	10.62	12.33	14.21	2.05	2.24	2.42	2.59	2.77	2.96	3.16	3.37	3.60
	27	3.12	3.84	4.73	5.79	7.01	8.39	9.92	11.60	13.42	2.56	2.72	2.87	3.03	3.20	3.38	3.57	3.79	4.02
	32	2.79	3.56	4.48	5.56	6.77	8.12	9.60	11.21	12.94	2.89	3.04	3.19	3.35	3.53	3.71	3.92	4.15	4.41
	38	2.65	3.43	4.35	5.38	6.53	7.79	9.15	10.61	12.17	3.30	3.46	3.62	3.79	3.99	4.20	4.43	4.70	4.99
	43	2.56	3.31	4.16	5.00	6.16	7.30	8.52	9.81	11.18	3.68	3.85	4.04	4.24	4.46	4.70	4.98	5.28	5.62
	48	2.30	2.97	3.73	4.56	5.57	6.60				4.12	4.32	4.54	4.78	5.04	5.33			
ZXL0600	20	3.70	4.70	5.84	7.14	8.63	10.32	12.23	14.38	16.78	2.56	2.72	2.89	3.09	3.32	3.57	3.85	4.16	4.50
	27	3.51	4.44	5.51	6.72	8.09	9.66	11.42	13.41	15.64	3.21	3.37	3.55	3.75	3.97	4.22	4.49	4.78	5.11
	32	3.44	4.35	5.37	6.53	7.85	9.34	11.02	12.91	15.03	3.58	3.76	3.96	4.17	4.40	4.66	4.94	5.24	5.56
	38	3.28	4.17	5.17	6.29	7.55	8.98	10.58	12.37	14.38	4.05	4.27	4.51	4.76	5.02	5.30	5.60	5.93	6.28
	43	2.96	3.86	4.85	5.96	7.19	8.57	10.12	11.85	13.78	4.58	4.85	5.13	5.42	5.72	6.04	6.38	6.73	7.11
	48	2.71	3.50	4.29	5.39	6.60	7.96				5.32	5.65	5.98	6.33	6.68	7.05			
ZXL0750	20	4.20	5.60	6.90	8.00	9.50	11.43	13.31	15.49	17.97	3.02	3.17	3.34	3.53	3.74	3.99	4.27	4.60	4.96
	27	4.00	5.16	6.18	7.43	8.91	10.80	12.58	14.78	17.24	3.51	3.68	3.87	4.08	4.33	4.61	4.93	5.29	5.70
	32	3.76	4.71	5.84	7.17	8.68	10.40	12.31	14.44	16.78	3.88	4.06	4.28	4.52	4.79	5.10	5.45	5.84	6.28
	38	3.52	4.55	5.71	7.02	8.48	10.09	11.86	13.80	15.90	4.40	4.61	4.85	5.12	5.43	5.77	6.16	6.59	7.08
	43	3.41	4.42	5.53	6.75	8.07	9.52	11.08	12.76	14.58	4.93	5.17	5.43	5.73	6.07	6.45	6.87	7.34	7.86
	48	3.12	4.04	5.01	6.06	7.50	8.70				5.58	5.85	6.14	6.47	6.84	7.25			

Note: Based on the return gas temperature of 5°C.
Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXL Family: Low Temperature

Capacity and Power (kW) at **60 Hz** - TF5/ TF7

R22 - 60 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)									Power Evaporating Temperature (°C)								
		-40	-35	-30	-25	-20	-15	-10	-5	0	-40	-35	-30	-25	-20	-15	-10	-5	0
ZXL0200	20	1.51	1.95	2.44	3.02	3.69	4.48	5.41	6.50	7.76	1.40	1.46	1.51	1.56	1.61	1.66	1.71	1.77	1.84
	32	1.28	1.78	2.30	2.86	3.49	4.19	5.00	5.92	6.99	1.74	1.80	1.86	1.92	1.98	2.05	2.12	2.20	2.30
	38	1.21	1.74	2.28	2.84	3.44	4.11	4.85	5.70	6.67	1.95	2.01	2.07	2.14	2.21	2.29	2.37	2.47	2.58
	43	1.11	1.67	2.22	2.78	3.36	4.00				2.17	2.23	2.30	2.37	2.45	2.54			
	48	0.92	1.51	2.07	2.63	3.20	3.81				2.45	2.52	2.59	2.67	2.76	2.85			
ZXL0250	20	2.37	2.52	2.93	3.56	4.37	5.33	6.41	7.56	8.77	1.85	1.89	1.91	1.98	1.99	2.02	2.07	2.14	2.23
	32	2.36	2.48	2.82	3.38	4.11	4.99	5.97	7.03	8.13	2.23	2.25	2.29	2.33	2.40	2.48	2.58	2.70	2.84
	38	2.34	2.46	2.75	3.26	3.93	4.75	5.67	6.67	7.70	2.62	2.65	2.68	2.73	2.80	2.88	2.98	3.10	3.25
	43	2.38	2.50	2.71	3.16	3.78	4.54				3.01	3.02	3.05	3.09	3.14	3.21			
	48	2.39	2.51	2.69	3.08	3.64	4.34				3.38	3.39	3.39	3.41	3.44	3.49			
ZXL0300	20	2.70	2.87	3.34	4.06	4.98	6.08	7.31	8.62	9.99	1.92	1.97	1.99	2.06	2.07	2.10	2.15	2.22	2.32
	32	2.69	2.83	3.22	3.85	4.69	5.69	6.81	8.02	9.27	2.32	2.34	2.38	2.43	2.49	2.58	2.68	2.80	2.95
	38	2.67	2.81	3.14	3.71	4.48	5.42	6.47	7.60	8.78	2.73	2.75	2.79	2.84	2.91	2.99	3.10	3.23	3.38
	43	2.71	2.85	3.09	3.60	4.31	5.18				3.13	3.14	3.17	3.21	3.27	3.34			
	48	2.72	2.86	3.07	3.52	4.15	4.95				3.52	3.52	3.53	3.54	3.58	3.63			
ZXL0350	20	3.26	3.48	4.04	4.91	6.03	7.36	8.84	10.43	12.09	2.25	2.30	2.32	2.41	2.42	2.46	2.52	2.60	2.72
	32	3.26	3.42	3.90	4.66	5.67	6.88	8.24	9.70	11.22	2.71	2.74	2.78	2.84	2.92	3.01	3.14	3.28	3.46
	38	3.23	3.40	3.80	4.49	5.43	6.55	7.83	9.20	10.62	3.19	3.22	3.26	3.33	3.40	3.50	3.63	3.78	3.95
	43	3.28	3.45	3.74	4.36	5.22	6.27				3.66	3.68	3.71	3.76	3.82	3.91			
	48	3.30	3.46	3.72	4.25	5.03	5.98				4.11	4.12	4.13	4.15	4.19	4.25			
ZXL0400	20	4.57	4.88	5.55	6.54	7.83	9.39	11.19	13.21	15.43	2.84	2.87	2.96	3.06	3.14	3.19	3.17	3.06	2.83
	32	3.61	4.21	5.07	6.17	7.48	8.97	10.62	12.41	14.29	3.25	3.38	3.55	3.72	3.88	3.98	4.01	3.93	3.72
	38	3.36	4.02	4.90	5.98	7.22	8.60	10.10	11.68	13.33	3.71	3.88	4.07	4.27	4.45	4.57	4.60	4.53	4.33
	43	3.16	3.83	4.69	5.70	6.85	8.10				4.17	4.36	4.58	4.80	4.98	5.11			
	48	2.88	3.53	4.33	5.25	6.27	7.35				4.68	4.89	5.13	5.35	5.54	5.67			
ZXL0500	20	4.80	6.02	6.84	7.99	9.47	11.27	13.38	15.79	18.50	2.77	2.97	3.19	3.41	3.60	3.73	3.79	3.74	3.56
	32	3.90	4.71	5.73	6.97	8.42	10.06	11.88	13.88	16.04	3.57	3.76	3.98	4.21	4.42	4.58	4.67	4.67	4.55
	38	3.73	4.62	5.67	6.86	8.20	9.66	11.25	12.95	14.76	4.01	4.22	4.47	4.73	4.97	5.17	5.31	5.36	5.29
	43	3.64	4.55	5.56	6.67	7.87	9.15				4.47	4.71	5.00	5.29	5.58	5.83			
	48	3.38	4.27	5.22	6.20	7.22	8.27				5.07	5.36	5.69	6.04	6.38	6.69			
ZXL0600	20	5.71	7.17	8.14	9.51	11.27	13.41	15.92	18.79	22.02	3.58	3.83	4.12	4.40	4.64	4.82	4.89	4.83	4.60
	32	4.64	5.60	6.82	8.30	10.02	11.97	14.13	16.51	19.09	4.60	4.85	5.14	5.43	5.70	5.91	6.03	6.03	5.87
	38	4.44	5.50	6.75	8.17	9.76	11.50	13.39	15.41	17.56	5.17	5.44	5.76	6.10	6.41	6.67	6.85	6.91	6.83
	43	4.33	5.41	6.62	7.94	9.37	10.89				5.76	6.08	6.45	6.83	7.20	7.52			
	48	4.03	5.09	6.21	7.38	8.60	9.84				6.54	6.91	7.34	7.79	8.23	8.62			
ZXL0750	20	6.05	7.60	8.62	10.08	11.94	14.21	16.88	19.92	23.34	3.93	4.22	4.53	4.84	5.11	5.30	5.38	5.31	5.06
	32	4.91	5.93	7.23	8.80	10.62	12.68	14.98	17.50	20.23	5.06	5.34	5.65	5.97	6.27	6.50	6.63	6.63	6.46
	38	4.71	5.83	7.15	8.66	10.34	12.19	14.19	16.34	18.61	5.68	5.99	6.34	6.71	7.05	7.34	7.54	7.60	7.51
	43	4.59	5.74	7.02	8.42	9.93	11.54				6.34	6.69	7.09	7.51	7.92	8.27			
	48	4.27	5.39	6.58	7.82	9.11	10.43				7.19	7.60	8.07	8.57	9.05	9.49			

Notes: Based on a return gas temperature of 5°C.
Power includes condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXL Family: Low Temperature

Capacity and Power (kW) at **50 Hz** - TFD

R404A/R507 - 50 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)									Power Evaporating Temperature (°C)								
		-40	-35	-30	-25	-20	-15	-10	-5	0	-40	-35	-30	-25	-20	-15	-10	-5	0
ZXL020E	20	1.83	2.17	2.55	2.97	3.42	3.92	4.46	5.04	5.66	1.22	1.36	1.50	1.65	1.70	1.95	2.12	2.28	2.38
	27	1.66	2.02	2.42	2.86	3.34	3.86	4.42	5.02	5.66	1.35	1.47	1.60	1.73	1.86	2.00	2.14	2.29	2.44
	32	1.45	1.82	2.24	2.70	3.19	3.73	4.31	4.92	5.58	1.50	1.60	1.71	1.83	1.95	2.08	2.21	2.34	2.48
	38	1.25	1.49	1.93	2.40	2.92	3.47	4.07	4.70	5.38	1.72	1.81	1.91	2.01	2.12	2.23	2.34	2.46	2.59
	43	1.10	1.23	1.58	2.07	2.60	3.18	3.79	4.44	5.13	1.95	2.03	2.11	2.20	2.30	2.39	2.50	2.60	2.72
	48	0.99	1.12	1.16	1.67	2.21	2.80				2.22	2.29	2.36	2.44	2.52	2.60			
ZXL025E	20	2.00	2.36	2.86	3.44	4.10	4.83	5.64	6.53	7.49	1.34	1.46	1.55	1.66	1.76	2.10	2.33	2.44	2.54
	27	1.89	2.31	2.80	3.37	4.02	4.74	5.54	6.42	7.37	1.59	1.68	1.77	1.87	1.97	2.23	2.36	2.50	2.64
	32	1.80	2.26	2.74	3.30	3.94	4.65	5.44	6.31	7.25	1.84	1.90	1.99	2.08	2.18	2.35	2.48	2.61	2.74
	38	1.63	2.03	2.50	3.05	3.68	4.38	5.15	6.01	6.94	2.12	2.16	2.22	2.31	2.41	2.61	2.72	2.84	2.96
	43	1.31	1.70	2.16	2.70	3.31	4.01	4.77	5.62	6.54	2.44	2.45	2.50	2.57	2.67	2.90	3.01	3.11	3.22
	48	1.20	1.24	1.69	2.22	2.82	3.51				2.89	2.90	2.91	2.98	3.08	3.28			
ZXL030E	20	2.23	2.87	3.62	4.45	5.35	6.30	7.29	8.30	9.31	1.55	1.73	1.90	2.07	2.10	2.39	2.53	2.60	2.70
	27	2.09	2.58	3.17	3.85	4.60	5.41	6.25	7.61	8.67	1.67	1.84	2.00	2.15	2.30	2.45	2.58	2.71	2.83
	32	2.08	2.49	3.00	3.60	4.27	5.00	5.77	7.35	8.38	1.89	2.05	2.20	2.35	2.49	2.62	2.75	2.87	2.99
	38	2.00	2.33	2.77	3.31	3.92	4.59	5.31	6.95	7.95	2.31	2.45	2.60	2.73	2.86	2.99	3.10	3.21	3.32
	43	1.73	2.03	2.44	2.95	3.54	4.19	4.89	6.55	7.52	2.77	2.91	3.05	3.18	3.30	3.41	3.52	3.62	3.72
	48	1.50	1.70	2.00	2.38	2.96	3.61				3.36	3.49	3.61	3.73	3.84	3.95			
ZXL035E	20	2.70	3.47	4.25	5.07	5.95	6.92	8.00	9.22	10.62	1.91	1.95	2.03	2.30	2.50	2.70	2.80	3.00	3.20
	27	2.55	3.31	4.07	4.85	5.69	6.61	7.63	8.78	10.09	2.26	2.33	2.43	2.56	2.72	2.90	3.08	3.27	3.47
	32	2.47	3.20	3.94	4.68	5.48	6.35	7.31	8.40	9.63	2.59	2.67	2.79	2.93	3.11	3.31	3.52	3.74	3.96
	38	2.37	3.08	3.75	4.45	5.17	5.97	6.85	7.84	8.98	3.00	3.09	3.22	3.38	3.58	3.79	4.03	4.28	4.53
	43	2.28	2.94	3.57	4.20	4.86	5.59	6.38	7.29	8.33	3.31	3.40	3.58	3.70	3.91	4.14	4.39	4.66	4.94
	48	2.17	2.76	3.33	3.89	4.48	5.12				4.00	4.15	4.30	4.45	4.50	4.60			
ZXL040E	20	3.78	4.51	5.38	6.38	7.49	8.71	10.01	11.39	12.84	2.45	2.70	2.75	3.01	3.05	3.12	3.90	4.07	4.20
	27	3.24	3.99	4.86	5.85	6.93	8.10	9.35	10.66	12.01	2.69	2.88	3.10	3.34	3.40	3.50	4.10	4.31	4.50
	32	3.02	3.77	4.63	5.58	6.63	7.75	8.93	10.16	11.43	2.99	3.17	3.39	3.64	3.90	4.17	4.43	4.67	4.88
	38	2.85	3.56	4.37	5.27	6.25	7.28	8.36	9.48	10.63	3.54	3.70	3.91	4.15	4.41	4.68	4.94	5.19	5.41
	43	2.67	3.34	4.10	4.93	5.83	6.77	7.75	8.76	9.78	4.08	4.22	4.40	4.62	4.87	5.12	5.38	5.63	5.85
	48	2.38	2.99	3.68	4.43	5.23	6.06				4.63	4.73	4.88	5.07	5.29	5.52			
ZXL050E	20	4.42	5.18	6.21	7.47	8.91	10.50	12.20	13.98	15.78	2.70	3.00	3.20	3.40	3.65	3.80	4.20	4.50	4.70
	27	3.80	4.58	5.58	6.78	8.12	9.57	11.09	12.64	14.19	2.92	3.16	3.39	3.62	3.86	4.09	4.40	4.58	4.83
	32	3.52	4.31	5.29	6.43	7.69	9.04	10.42	11.81	13.17	3.26	3.49	3.72	3.96	4.20	4.46	4.72	5.00	5.29
	38	3.25	4.03	4.98	6.06	7.22	8.43	9.65	10.84	11.97	3.88	4.10	4.33	4.57	4.83	5.11	5.41	5.73	6.07
	43	2.99	3.77	4.69	5.71	6.78	7.87	8.95	9.97	10.89	4.43	4.64	4.87	5.12	5.40	5.70	6.03	6.39	6.77
	48	2.63	3.40	4.28	5.23	6.21	7.19				4.89	5.10	5.33	5.59	5.88	6.21			
ZXL060E	20	4.84	5.80	6.92	8.19	9.59	11.11	12.72	14.41	16.16	3.00	3.20	3.50	3.76	3.90	4.15	4.41	4.67	5.20
	27	4.49	5.51	6.68	7.99	9.42	10.95	12.57	14.27	16.01	3.62	3.84	4.08	4.36	4.66	4.97	5.30	5.63	5.97
	32	4.30	5.32	6.48	7.77	9.17	10.67	12.26	13.91	15.60	4.04	4.27	4.53	4.83	5.16	5.51	5.88	6.27	6.66
	38	4.07	5.02	6.12	7.34	8.66	10.08	11.57	13.11	14.70	4.60	4.84	5.12	5.44	5.80	6.19	6.61	7.05	7.51
	43	3.81	4.67	5.67	6.79	8.00	9.30	10.67	12.09	13.54	5.17	5.41	5.69	6.03	6.42	6.84	7.30	7.78	8.29
	48	3.42	4.16	5.03	6.00	7.07	8.22				5.88	6.11	6.41	6.76	7.16	7.61			
ZXL075E	20	5.50	6.64	7.94	9.41	11.06	12.91	14.96	17.24	19.75	3.47	3.73	4.01	4.31	4.64	4.98	5.34	5.70	6.09
	27	4.99	6.14	7.42	8.84	10.40	12.13	14.03	16.12	18.41	3.93	4.20	4.51	4.84	5.21	5.59	6.01	6.44	6.89
	32	4.75	5.90	7.14	8.50	9.99	11.61	13.39	15.33	17.45	4.35	4.63	4.94	5.30	5.68	6.10	6.55	7.03	7.53
	38	4.49	5.61	6.80	8.08	9.46	10.94	12.55	14.30	16.19	4.98	5.25	5.58	5.95	6.36	6.81	7.30	7.83	8.38
	43	4.21	5.30	6.43	7.63	8.90	10.25	11.71	13.28	14.97	5.61	5.89	6.22	6.60	7.03	7.51	8.03	8.59	9.19
	48	3.81	4.85	5.91	7.01	8.16	9.38				6.38	6.65	6.98	7.38	7.82	8.32			

Notes: Based on the return gas temperature of 5°C.
Power include condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZXL Family: Low Temperature
Capacity and Power (kW) at 60 Hz - TF5/ TF7

R404A /R507 - 60 Hz

Model	Ambient Temperature (°C)	Capacity Evaporating Temperature (°C)									Power Evaporating Temperature (°C)								
		-40	-35	-30	-25	-20	-15	-10	-5	0	-40	-35	-30	-25	-20	-15	-10	-5	0
ZXL020E	20	1.85	2.31	2.89	3.56	4.31	5.12	5.99	6.90	7.83	1.59	1.65	1.71	1.78	1.86	1.94	2.02	2.11	2.19
	32	1.51	2.04	2.65	3.32	4.03	4.77	5.53	6.30	7.05	2.03	2.10	2.18	2.27	2.36	2.46	2.57	2.67	2.78
	38	1.46	2.01	2.61	3.26	3.93	4.62	5.31	5.98	6.62	2.29	2.37	2.46	2.56	2.66	2.77	2.89	3.00	3.12
	43	1.37	1.92	2.52	3.14	3.78	4.41				2.54	2.63	2.73	2.83	2.95	3.07			
	48	1.18	1.73	2.30	2.89	3.48	4.05				2.84	2.93	3.04	3.15	3.27	3.40			
ZXL025E	20	2.06	2.60	3.28	4.11	5.09	6.24	7.58	9.11	10.84	1.65	1.78	1.91	2.03	2.13	2.19	2.21	2.17	2.07
	32	1.93	2.46	3.08	3.80	4.64	5.61	6.72	7.98	9.41	2.27	2.39	2.53	2.66	2.79	2.89	2.97	2.99	2.97
	38	1.92	2.42	3.00	3.65	4.41	5.27	6.25	7.36	8.62	2.63	2.75	2.90	3.05	3.20	3.34	3.44	3.51	3.53
	43	1.86	2.33	2.85	3.45	4.12	4.88				2.98	3.11	3.27	3.45	3.62	3.78			
	48	1.68	2.11	2.58	3.11	3.69	4.35				3.40	3.55	3.73	3.92	4.12	4.32			
ZXL030E	20	2.79	3.39	4.15	5.04	6.02	7.06	8.10	9.13	10.10	1.98	2.09	2.22	2.35	2.47	2.54	2.54	2.46	2.26
	32	2.56	3.13	3.81	4.59	5.42	6.26	7.07	7.83	8.49	2.52	2.60	2.74	2.90	3.08	3.25	3.38	3.45	3.45
	38	2.41	2.95	3.60	4.32	5.07	5.81	6.51	7.13	7.64	2.88	2.94	3.06	3.24	3.44	3.64	3.82	3.97	4.05
	43	2.20	2.73	3.35	4.02	4.71	5.37				3.31	3.34	3.45	3.63	3.84	4.07			
	48	1.89	2.41	3.00	3.62	4.25	4.83				3.91	3.91	4.00	4.17	4.39	4.65			
ZXL035E	20	3.14	3.93	4.91	6.04	7.32	8.71	10.19	11.74	13.32	2.37	2.45	2.55	2.65	2.77	2.89	3.01	3.14	3.27
	32	2.57	3.47	4.51	5.64	6.85	8.12	9.41	10.71	11.98	3.02	3.12	3.25	3.38	3.52	3.67	3.83	3.98	4.14
	38	2.48	3.41	4.44	5.54	6.69	7.86	9.03	10.17	11.26	3.41	3.53	3.66	3.81	3.97	4.13	4.30	4.47	4.65
	43	2.33	3.27	4.28	5.34	6.42	7.50				3.79	3.92	4.06	4.22	4.39	4.57			
	48	2.00	2.94	3.92	4.92	5.92	6.89				4.23	4.37	4.53	4.70	4.88	5.07			
ZXL040E		3.75	4.74	5.97	7.48	9.27	11.37	13.80	16.58	19.74	2.56	2.76	2.96	3.14	3.30	3.40	3.43	3.37	3.21
	32	3.52	4.48	5.60	6.92	8.45	10.21	12.23	14.53	17.12	3.52	3.70	3.91	4.13	4.32	4.49	4.60	4.64	4.60
	38	3.50	4.41	5.45	6.65	8.02	9.59	11.37	13.40	15.68	4.07	4.27	4.49	4.73	4.96	5.17	5.34	5.44	5.47
	43	3.38	4.23	5.19	6.27	7.50	8.89				4.62	4.83	5.07	5.34	5.61	5.86			
	48	3.05	3.84	4.70	5.66	6.72	7.92				5.27	5.50	5.78	6.08	6.39	6.69			
ZXL050E	20	5.36	5.97	6.95	8.27	9.92	11.86	14.08	16.54	19.21	3.56	3.85	4.06	4.20	4.32	4.42	4.53	4.68	4.87
	32	4.78	5.61	6.70	8.00	9.49	11.15	12.95	14.86	16.86	3.91	4.19	4.45	4.71	5.00	5.32	5.72	6.20	6.80
	38	4.32	5.23	6.31	7.55	8.92	10.39	11.93	13.52	15.14	4.80	5.03	5.27	5.53	5.85	6.24	6.72	7.32	8.07
	43	3.99	4.93	5.99	7.16	8.39	9.68				5.62	5.79	5.98	6.22	6.54	6.96			
	48	3.79	4.74	5.75	6.82	7.90	8.98				6.35	6.42	6.55	6.75	7.05	7.47			
ZXL060E	20	5.85	7.17	8.69	10.36	12.14	14.01	15.92	17.83	19.70	4.57	4.65	4.93	5.34	5.79	6.20	6.49	6.56	6.35
	32	5.51	6.71	8.06	9.51	11.03	12.59	14.14	15.64	17.07	5.53	5.62	5.94	6.42	6.97	7.50	7.94	8.19	8.19
	38	5.25	6.38	7.63	8.97	10.35	11.74	13.10	14.40	15.59	6.36	6.42	6.73	7.21	7.77	8.33	8.81	9.13	9.19
	43	4.98	6.04	7.21	8.45	9.71	10.95				7.25	7.27	7.56	8.02	8.58	9.15			
	48	4.65	5.65	6.73	7.86	8.99	10.09				8.35	8.32	8.56	8.99	9.53	10.09			
ZXL075E	20	6.81	7.58	8.82	10.50	12.60	15.07	17.88	21.00	24.40	4.99	5.39	5.68	5.89	6.05	6.19	6.34	6.55	6.82
	32	6.07	7.13	8.50	10.15	12.05	14.16	16.44	18.87	21.42	5.48	5.87	6.24	6.60	6.99	7.45	8.00	8.68	9.51
	38	5.49	6.64	8.02	9.59	11.33	13.19	15.15	17.18	19.23	6.72	7.04	7.37	7.74	8.18	8.73	9.41	10.25	11.30
	43	5.07	6.26	7.61	9.09	10.66	12.29				7.87	8.10	8.37	8.71	9.16	9.74			
	48	4.81	6.01	7.31	8.66	10.04	11.40				8.89	8.99	9.16	9.44	9.86	10.45			

Notes: Based on a return gas temperature of 5°C.
Power includes condenser fan.
Ambient 38°C and 43°C are typical design conditions for unit selection.

ZX Family: Medium Temperature

Technical Data at **50 Hz** - PFJ

Family				ZX			
Nominal Rating		Horsepower	HP	2	2.5	3	4
Model Name				ZX0200	ZX0250	ZX0300	ZX0400
				ZX020E	ZX025E	ZX030E	ZX040E
Performance	R22	ET/AT/RGT	°C	-6.7/32/18.3			
		Capacity	kW	3.85	4.58	5.5	7.3
		COP	W/W	2.41	2.18	2.5	2.52
	R404A/R507A	ET/AT/RGT	°C	-6.7/32/18.3			
		Capacity	kW	4.30	5.05	6.00	7.80
		COP	W/W	2.26	2.05	2.35	2.29
	Sound Pressure Level	@1m	dB(A)	60			
Compressor	Model Name	R22		ZX15KC-PFJ	ZX19KC-PFJ	ZX21KC-PFJ	ZX29KC-PFJ
		R404A/R507A		ZX15KCE-PFJ	ZX19KCE-PFJ	ZX21KCE-PFJ	ZX29KCE-PFJ
	Rated Load Ampere	R22	Amp	13.2	14.6	16.4	20.0
		R404A/R507A		13.2	14.6	16.4	20.0
	Locked Rotor Ampere	R22	Amp	58.0	61.0	82.0	114.0
		R404A/R507A		58.0	61.0	82.0	114.0
	Oil Type	R22		MINERAL			
		R404A/R507A		POE			
	Oil Recharge Volume	R22/R404A /R507A	Liters	1.18	1.33	1.33	1.83
Fan Motor	Number of Fan		Pieces	1	1	1	1
	Diameter		mm	450	450	450	450
	Fan Speed		rpm	933	933	933	933
	Air Flow	Total	m3/h	3483	3483	3483	3483
	Total Fan Motor Power	Input	W	116	116	116	116
Others	Oil Separator	Volume	Liters	0.5			
	Receiver Volume	R22	kg	5.1	5.1	5.1	5.1
		R404A/R507A	kg	4.4	4.4	4.4	4.4
	Pipes	Suction OD	Inch	3/4	3/4	3/4	3/4
		Liquid OD	Inch	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X840			
	Weight	Net	kg	76	79	79	100
		Gross	kg	114	117	117	138

ZX Family: Medium Temperature

Technical Data at **50 Hz** - TFD

Family				ZX						
Nominal Rating		Horsepower	HP	2	3	4	5	6	7.5	7.6
Model Name				ZX0200 ZX020E	ZX0300 ZX030E	ZX0400 ZX040E	ZX0500 ZX050E	ZX0600 ZX060E	ZX0750 ZX075E	ZX0760 ZX076E
Performance	R22	ET/AT/RGT	°C	-6.7/32/18.3						
		Capacity	kW	3.85	5.50	7.30	9.30	11.20	12.60	12.85
		COP	W/W	2.41	2.50	2.52	2.66	2.60	2.57	2.65
	R404A/R507A	ET/AT/RGT	°C	-6.7/32/18.3						
		Capacity	kW	4.30	6.00	7.80	10.70	11.80	13.20	13.46
		COP	W/W	2.26	2.35	2.29	2.43	2.41	2.40	2.50
	Sound Pressure Level	@1m	dB(A)	60						
Compressor	Model Name	R22		ZX15KC-TFD	ZX21KC-TFD	ZX30KC-TFD	ZX38KC-TFD	ZX45KC-TFD	ZX51KC-TFD	ZX51KC-TFD
		R404A/R507A		ZX15KCE-TFD	ZX21KCE-TFD	ZX30KCE-TFD	ZX38KCE-TFD	ZX45KCE-TFD	ZX51KCE-TFD	ZX51KCE-TFD
	Rated Load Ampere	R22	Amp	4.3	5.7	7.4	8.9	11.5	12.0	12.0
		R404A/R507A	Amp	5.0	6.1	7.5	9.6	11.5	11.8	11.8
	Locked Rotor Ampere	R22	Amp	26.0	36.0	44.3	58.6	67.0	101.0	101.0
		R404A/R507A	Amp	26.0	36.0	44.3	58.6	67.0	101.0	101.0
	Oil Type	R22		MINERAL						
		R404A/R507A		POE						
	Oil Recharge Volume	R22/R404A / R507A	Liters	1.18	1.33	1.83	1.83	1.66	1.66	1.66
Fan Motor	Number of Fan		Pieces	1	1	1	2	2	2	2
	Diameter		mm	450	450	450	450	450	450	450
	Fan Speed		rpm	830	830	830	830	830	830	830
	Air Flow	Total	m3/h	2922	2922	2922	5910	5910	5910	5910
	Total Fan Motor Power	Input	W	116	116	116	246	246	246	246
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	5.1	5.1	5.1	7.2	7.2	7.2	7.2
		R404A/R507A	kg	4.4	4.4	4.4	6.3	6.3	6.3	6.3
	Pipes Suction	OD	Inch	3/4	3/4	7/8	7/8	7/8	7/8	7/8
		Liquid OD	Inch	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X840			1029X424X1242			
	Weight	Net	kg	76	79	91	108	112	118	121
		Gross	kg	113.5	116.5	121	152	156	162	154

ZX Family: Medium Temperature

Technical Data at **60 Hz** - TF5/TF7

Family				ZX					
Nominal Rating		Horsepower	HP	2	3	4	5	6	7.5
Model Name				ZX0200 ZX020E	ZX0300 ZX030E	ZX0400 ZX040E	ZX0500 ZX050E	ZX0600 ZX060E	ZX0750 ZX075E
Performance	R22	ET/AT/RGT	°C	-7/32/18.3					
		Capacity	kW	4.6	6.49	9.52	10.76	12.77	14.18
		COP	W/W	2.42	2.37	2.56	2.51	2.45	2.37
	R404A/R507A	ET/AT/RGT	°C	-7/32/18.3					
		Capacity	kW	5.10	7.30	10.16	12.46	14.48	15.28
		COP	W/W	2.37	2.27	2.48	2.43	2.42	2.22
	Sound Pressure Level	@1m	dB(A)	60					
Compressor	Model Name	R22		ZX15KC-TF5/TF7	ZX21KC-TF5/TF7	ZX29KC-TF5/TF7	ZX38KC-TF5/TF7	ZX45KC-TF5/TF7	ZX51KC-TF5/TF7
		R404A/R507A		ZX15KCE-TF5/TF7	ZX21KCE-TF5/TF7	ZX29KCE-TF5/TF7	ZX38KCE-TF5/TF7	ZX45KCE-TF5/TF7	ZX51KCE-TF5/TF7
	Rated Load Ampere	R22	Amp	8.9/5	11.4/7.5	15/9.3	20.7/10.7	20.7/10.7	25/12.1
		R404A/R507A	Amp	8.9/5.1	12.1/7.4	15.7/9.6	24/12.4	23.1/12.6	26/14.1
	Locked Rotor Ampere	R22	Amp	55/27	77/39	115/54	128/64	156/70	164/100
		R404A/R507A	Amp	55/27	77/39	115/54	128/64	156/70	164/100
	Oil Type	R22		MINERAL					
		R404A/R507A		POE					
	Oil Recharge Volume	R22/R404A /R507A	Liters	1.18	1.33	1.83	1.83	1.66	1.66
Fan Motor	Number of Fan		Pieces	1	1	2	2	2	2
	Diameter		mm	450	450	450	450	450	450
	Fan Speed		rpm	933	933	933	933	933	933
	Air Flow	Total	m3/h	3483	3483	6966	6966	6966	6966
	Total Fan Motor Power	Input	W	145	145	290	290	290	290
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	5.1	5.1	7.2	7.2	7.2	7.2
		R404A/R507A	kg	4.4	4.4	6.3	6.3	6.3	6.3
	Pipes	Suction OD	Inch	3/4	3/4	3/4	3/4	3/4	3/4
		Liquid OD	Inch	1/2	1/2	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X840		1029X424X1242			
	Weight	Net	kg	76	79	100	108	112	121
		Gross	kg	113.5	116.5	135	152	156	162

ZXD Family: Digital Medium Temperature

Technical Data at **50 Hz** - TFD

Family				ZXD				
Nominal Rating		Horsepower	HP	4	5	6	7.5	7.6
Model Name				ZXD0400 ZXD040E	ZXD0500 ZXD050E	ZXD0600 ZXD060E	ZXD0750 ZXD075E	ZXD0760 ZXD076E
Performance	R22	ET/AT/RGT	°C	-6.7/32/18.3				
		Capacity	kW	7.76	9.3	11.2	12.6	12.85
		COP	W/W	2.67	2.66	2.6	2.57	2.67
	R404A/R507A	ET/AT/RGT	°C	-6.7/32/18.3				
		Capacity	kW	8.30	10.70	11.80	13.20	13.46
		COP	W/W	2.47	2.43	2.41	2.4	2.49
	Sound Pressure Level	@1m	dB(A)	60				
Compressor	Model Name	R22		ZBD29KQ-TFD	ZBD38KQ-TFD	ZBD45KQ-TFD	ZBD48KQ-TFD	ZBD48KQ-TFD
		R404A/R507A		ZBD29KQE-TFD	ZBD38KQE-TFD	ZBD45KQE-TFD	ZBD48KQE-TFD	ZBD48KQE-TFD
	Rated Load Ampere	R22	Amp	7.9	10	10	12.1	12.1
		R404A/R507A	Amp	7.7	10.4	9.6	12.4	12.4
	Locked Rotor Ampere	R22	Amp	48.0	64.0	74.0	100.0	100.0
		R404A/R507A	Amp	48.0	64.0	74.0	100.0	100.0
	Oil Type	R22		MINERAL				
		R404A/R507A		POE				
	Oil Recharge Volume	R22/R404A /R507A	Liters	1.24	1.77	1.77	1.77	1.77
Fan Motor	Number of Fan		Pieces	2	2	2	2	2
	Diameter		mm	450	450	450	450	450
	Fan Speed		rpm	830	830	830	830	830
	Air Flow	Total	m3/h	5910	5910	5910	5910	5910
	Total Fan Motor Power	Input	W	246	246	246	246	246
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	7.2	7.2	7.2	7.2	7.2
		R404A/R507A	kg	6.3	6.3	6.3	6.3	6.3
	Pipes	Suction OD	Inch	7/8	7/8	7/8	7/8	7/8
		Liquid OD	Inch	1/2	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X1242				
	Weight	Net	kg	104	112	114	119	122
		Gross	kg	148	156	158	163	171

ZXD Family: Digital Medium Temperature

Technical Data at **60 Hz** - TF7

Family				ZX			
Nominal Rating Model Name		Horsepower	HP	4 ZXD040E	5 ZXD050E	6 ZXD060E	7.5 ZXD075E
Performance	R22	ET/AT/RGT	°C	n/a	n/a	n/a	n/a
		Capacity	kW	n/a	n/a	n/a	n/a
		COP	W/W	n/a	n/a	n/a	n/a
	R404A/R507A	ET/AT/RGT	°C	-10/32/18.3			
		Capacity	kW	8.70	10.77	12.54	13.84
		COP	W/W	2.18	2.11	2.12	2.08
	Sound Pressure Level	@1m	dB(A)	60			
Compressor	Model Name	R22		n/a	n/a	n/a	n/a
		R404A/R507A		ZBD29KQE-TF7	ZBD38KQE-TF7	ZBD45KQE-TF7	ZBD48KQE-TF7
	Rated Load Ampere	R22	Amp	n/a	n/a	n/a	n/a
		R404A/R507A	Amp	9.6	11.6	12.9	14.6
	Locked Rotor Ampere	R22	Amp	n/a	n/a	n/a	n/a
		R404A/R507A	Amp	54.0	64.0	70.0	78.0
	Oil Type	R22		n/a			
		R404A/R507A		POE 3MAF			
	Oil Recharge Volume	R22/R404A /R507A	Liters	1.24	1.77	1.77	1.77
Fan Motor	Number of Fan		Pieces	2	2	2	2
	Diameter		mm	450	450	450	450
	Fan Speed		rpm	933	933	933	933
	Air Flow	Total	m3/h	6966	6966	6966	6966
	Total Fan Motor Power	Input	W	290	290	290	290
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	n/a	n/a	n/a	n/a
		R404A/R507A	kg	6.3	6.3	6.3	6.3
	Pipes	Suction OD	Inch	7/8	7/8	7/8	7/8
		Liquid OD	Inch	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X1242			
	Weight	Net	kg	109	117	121	127
		Gross	kg	148	156	158	163

ZXL Family: Low Temperature

Technical Data at **50 Hz** - TFD

Family				ZX							
Nominal Rating		Horsepower	HP	2	2.5	3	3.5	4	5	6	7.5
Model Name				ZXL0200 ZXL020E	ZXL0250 ZXL025E	ZXL0300 ZXL030E	ZXL0350 ZXL035E	ZXL0400 ZXL040E	ZXL0500 ZXL050E	ZXL0600 ZXL060E	ZXL0750 ZXL075E
Performance	R22	ET/AT/RGT	°C	-32/32/5°C							
		Capacity	kW	1.7	1.91	2.34	2.78	3.57	4.05	4.96	5.39
		COP	W/W	1.2	1.17	1.28	1.26	1.24	1.29	1.27	1.28
	R404A/R507A	ET/AT/RGT	°C	-32/32/5°C							
		Capacity	kW	2.11	2.51	2.80	3.65	4.26	4.99	5.91	6.65
		COP	W/W	1.24	1.28	1.29	1.34	1.29	1.36	1.33	1.38
	Sound Pressure Level	@1m	dB(A)	60				61			
Compressor	Model Name	R22		ZXI06KC-TFD	ZXI08KC-TFD	ZXI09KC-TFD	ZXI11KC-TFD	ZXI14KC-TFD	ZXI15KC-TFD	ZXI18KC-TFD	ZXI21KC-TFD
		R404A/R507A		ZXI06KCE-TFD	ZXI08KCE-TFD	ZXI09KCE-TFD	ZXI11KCE-TFD	ZXI14KCE-TFD	ZXI15KCE-TFD	ZXI18KCE-TFD	ZXI21KCE-TFD
	Rated Load Ampere	R22	Amp	5.4	5.5	5.7	7.4	8.1	8.8	11.1	12.1
		R404A/R507A	Amp	5.6	6.2	6.0	8.3	8.6	10.0	11.1	14.6
	Locked Rotor Ampere	R22	Amp	39.2	39.2	39.2	51.5	51.5	51.5	74.0	101.0
		R404A/R507A	Amp	39.2	39.2	39.2	51.5	51.5	51.5	74.0	101.0
	Oil Type	R22		MINERAL							
		R404A/R507A		POE							
	Oil Recharge Volume	R22/R404A /R507A	Liters	0.56	0.56	0.56	1.24	1.24	1.24	1.77	1.77
Fan Motor	Number of Fan		Pieces	1	1	1	1	1	2	2	2
	Diameter		mm	450	450	450	450	450	450	450	450
	Fan Speed		rpm	830	830	830	830	830	830	830	830
	Air Flow	Total	m3/h	2922	2922	2922	2922	2922	5910	5910	5910
	Total Fan Motor Power	Input	W	116	116	116	116	116	246	246	246
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	5.1	5.1	5.1	5.1	5.1	7.2	7.2	7.2
		R404A/R507A	kg	4.4	4.4	4.4	4.4	4.4	6.3	6.3	6.3
	Pipes	Suction OD	Inch	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8
		Liquid OD	Inch	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X840					1029X424X1242		
	Weight	Net	kg	79	81	81	93	93	106	116	121
		Gross	kg	117	119	119	131	131	150	165	170

ZXL Family: Low Temperature

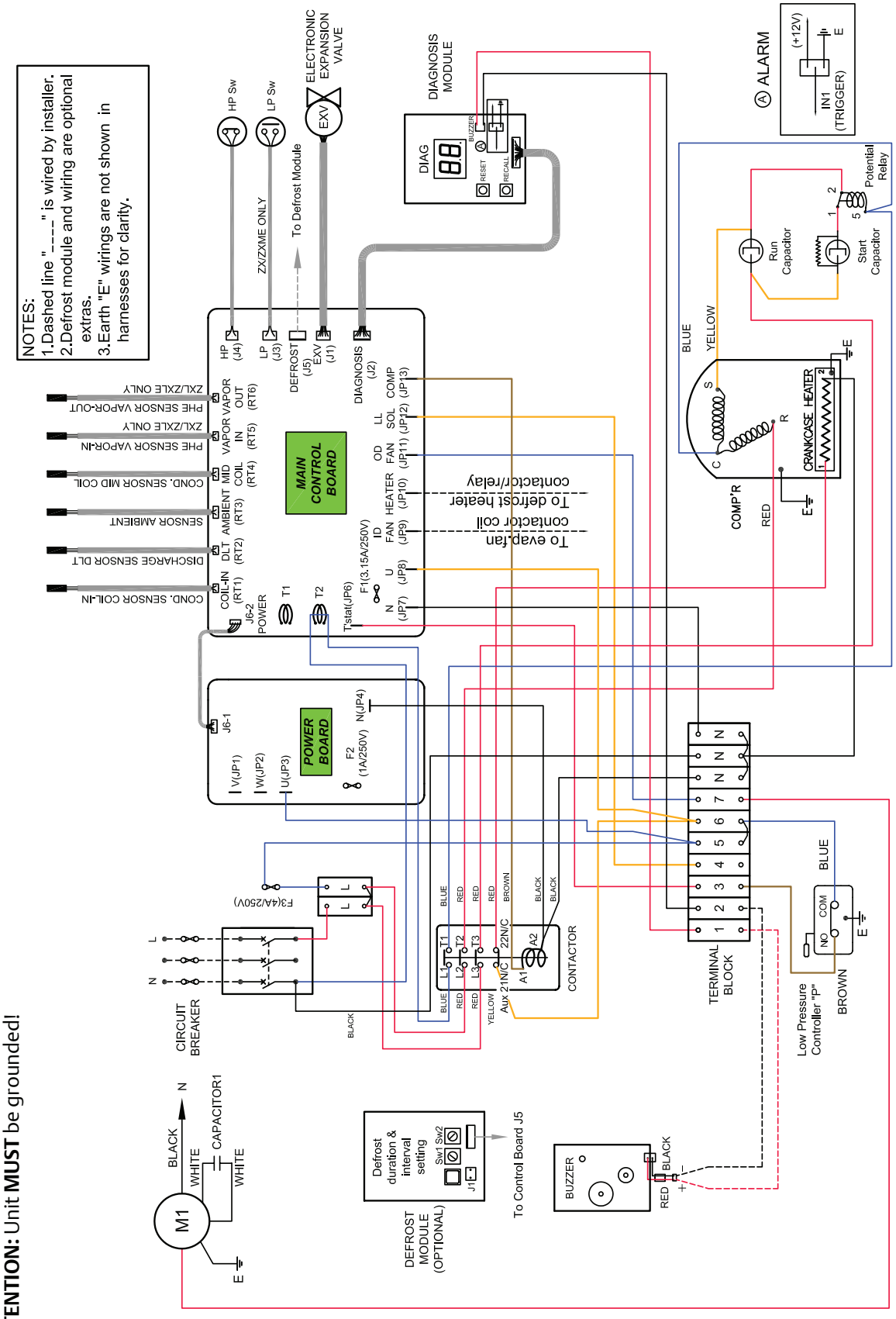
Technical Data at **60 Hz** - TF5/TF7

Family				ZX							
Nominal Rating		Horsepower	HP	2	2.5	3	3.5	4	5	6	7.5
Model Name				ZXL0200 ZXL020E	ZXL0250 ZXL025E	ZXL0300 ZXL030E	ZXL0350 ZXL035E	ZXL0400 ZXL040E	ZXL0500 ZXL050E	ZXL0600 ZXL060E	ZXL0750 ZXL075E
Performance	R22	ET/AT/RGT	°C	-32/32/5°C							
		Capacity	kW	2.09	2.69	2.99	2.59	4.72	5.32	6.34	6.81
		COP	W/W	1.14	1.18	1.28	1.31	1.36	1.37	1.27	1.24
	R404A/R507A	ET/AT/RGT	°C	-32/32/5°C							
		Capacity	kW	2.41	2.83	3.54	4.19	5.18	6.26	7.52	7.98
		COP	W/W	1.12	1.15	1.32	1.33	1.33	1.44	1.29	1.32
	Sound Pressure Level	@1m	dB(A)	60				61			
Compressor	Model Name	R22		ZXI06KC-TF5/7	ZXI08KC-TF5/7	ZXI09KC-TF5/7	ZXI11KC-TF5/7	ZXI14KC-TF5/7	ZXI15KC-TF5/7	ZXI18KC-TF5/7	ZXI21KC-TF5/7
		R404A/R507A		ZXI06KCE-TF5/7	ZXI08KCE-TF5/7	ZXI09KCE-TF5/7	ZXI11KCE-TF5/7	ZXI14KCE-TF5/7	ZXI15KCE-TF5/7	ZXI18KCE-TF5/7	ZXI21KCE-TF5/7
	Rated Load Ampere	R22	Amp	12.1	12.6	12.9	19.1	20	21.4	25.5	28.9
	TF5	R404A/R507A	Amp	12.1	12.6	12.9	19.1	20	21.4	25.5	28.9
	Rated Load Ampere	R22	Amp	5.4	5.5	6.9	7.7	9.9	12.6	14.1	14.4
	TF7	R404A/R507A	Amp	5.6	6.2	6.9	8.6	9.9	12.6	14.1	14.4
	Locked Rotor Ampere	R22	Amp	73.0	73.0	73.0	110.0	110.0	110.0	186.6	191.0
		R404A/R507A	Amp	34.8	34.8	38.6	47.0	66.0	73.5	94.3	94.3
	Oil Type	R22		MINERAL							
		R404A/R507A		POE							
	Oil Recharge Volume	R22/R404A /R507A	Liters	0.56	0.56	0.56	1.24	1.24	1.24	1.77	1.77
Fan Motor	Number of Fan		Pieces	1	1	1	1	2	2	2	2
	Diameter		mm	450	450	450	450	450	450	450	450
	Fan Speed		rpm	933	933	933	933	933	933	933	933
	Air Flow	Total	m3/h	3483	3483	3483	3483	6966	6966	6966	6966
	Total Fan Motor Power	Input	W	145	145	145	145	290	290	290	290
Others	Oil Separator	Volume	Liters	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Receiver Volume	R22	kg	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
		R404A/R507A	kg	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	Pipes	Suction OD	Inch	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8
		Liquid OD	Inch	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
	Dimension	W x D x H	mm	1029X424X840				1029X424X1242			
	Weight	Net	kg	79	81	81	93	93	106	116	121
		Gross	kg	117	119	119	131	143	150	165	170

ZX Condensing Unit Wiring Diagram

PFJ: 220V-50 Hz -1Ph

ATTENTION: Unit **MUST** be grounded!

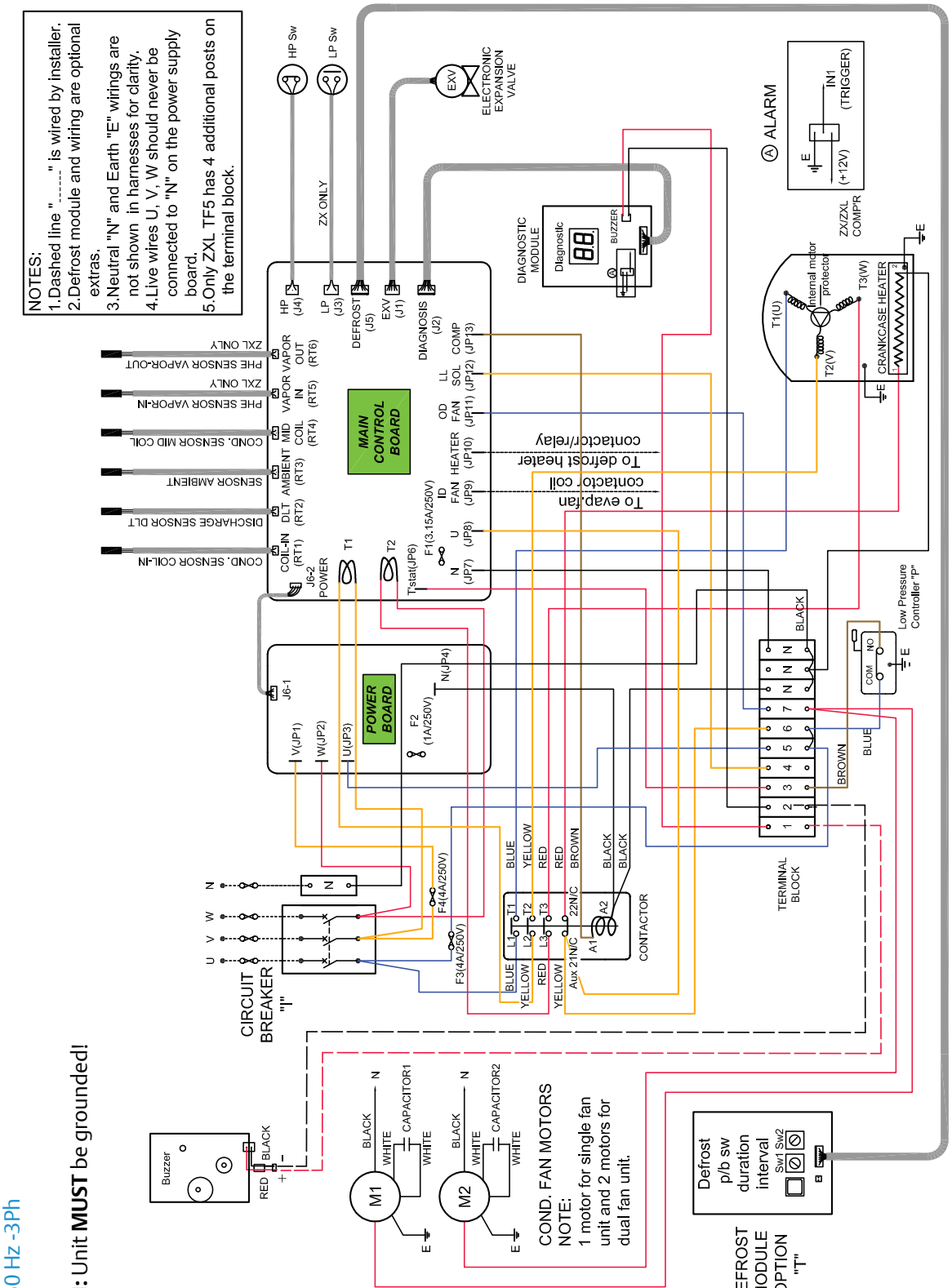


ZX/ZXL Condensing Unit Wiring Diagram

TFD: 380V/420V -50 Hz-3Ph

TF7: 380V-60 Hz -3Ph

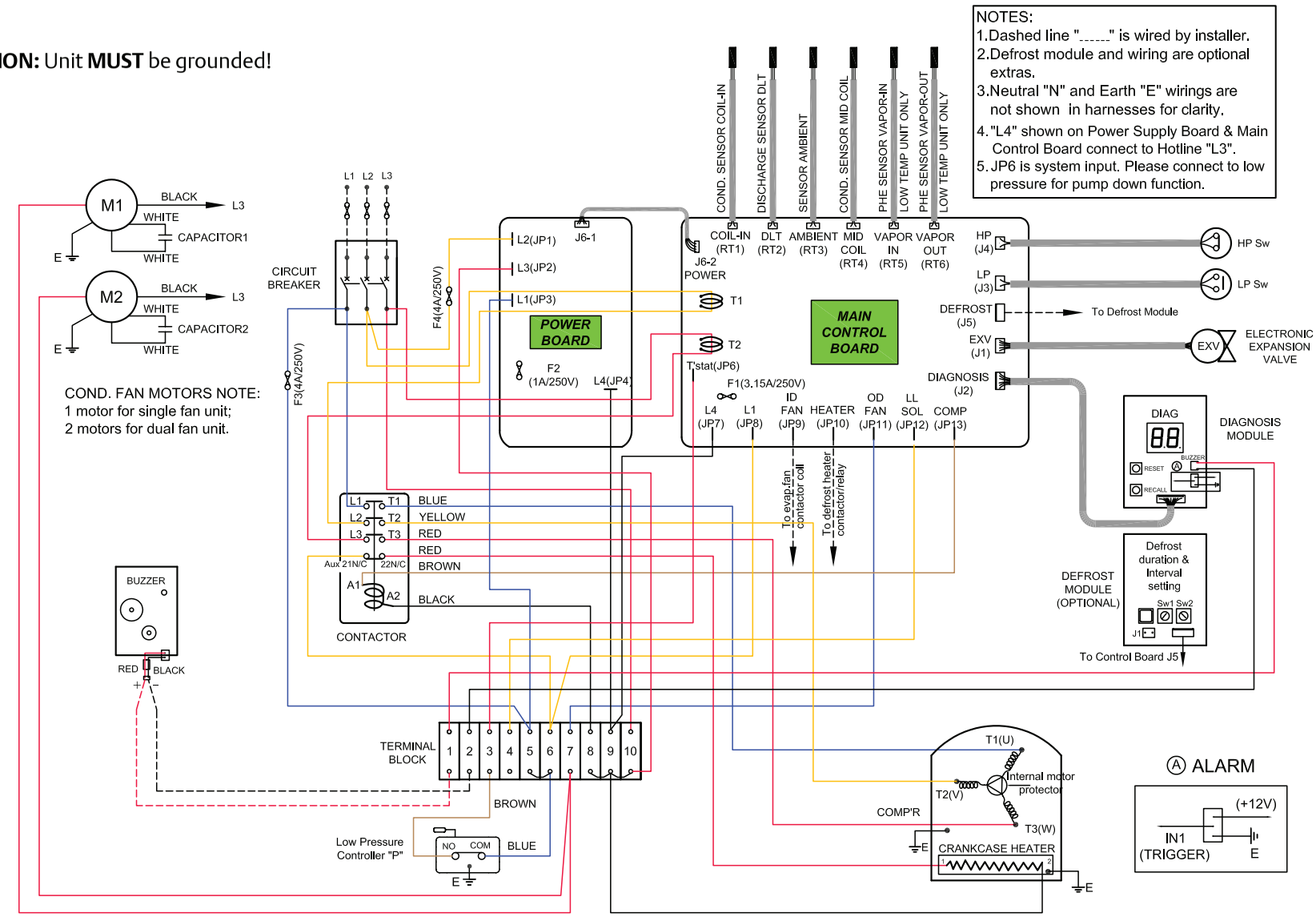
ATTENTION: Unit **MUST** be grounded!


NOTES:
1.Dashed line " _____ " is wired by installer.
2.Defrost module and wiring are optional extras.
3.Neutral "N" and Earth "E" wirings are not shown in harnesses for clarity.
4.Live wires U, V, W should never be connected to "N" on the power supply board.
5.Only ZXL TF5 has 4 additional posts on the terminal block.
MAIN CONTROL BOARD
POWER BOARD
DIAGNOSTIC MODULE
ELECTRONIC EXPANSION VALVE
ALARM
CIRCUIT BREAKER "I"
CONTACTOR
TERMINAL BLOCK
COND. FAN MOTORS NOTE:
1 motor for single fan unit and 2 motors for dual fan unit.
DEFROST MODULE OPTION "T"
To evap.fan contactor coil
To defrost heater contactor/relay
ZX ONLY
CRANKCASE HEATER
Low Pressure Controller "P"
Buzzer
CAPACITOR1
CAPACITOR2
Defrost p/b sw duration interval

ZX/ZXL Condensing Unit Wiring Diagram

TF5: 200/230V- 50 Hz/ 60 Hz - 3Ph

ATTENTION: Unit **MUST** be grounded!



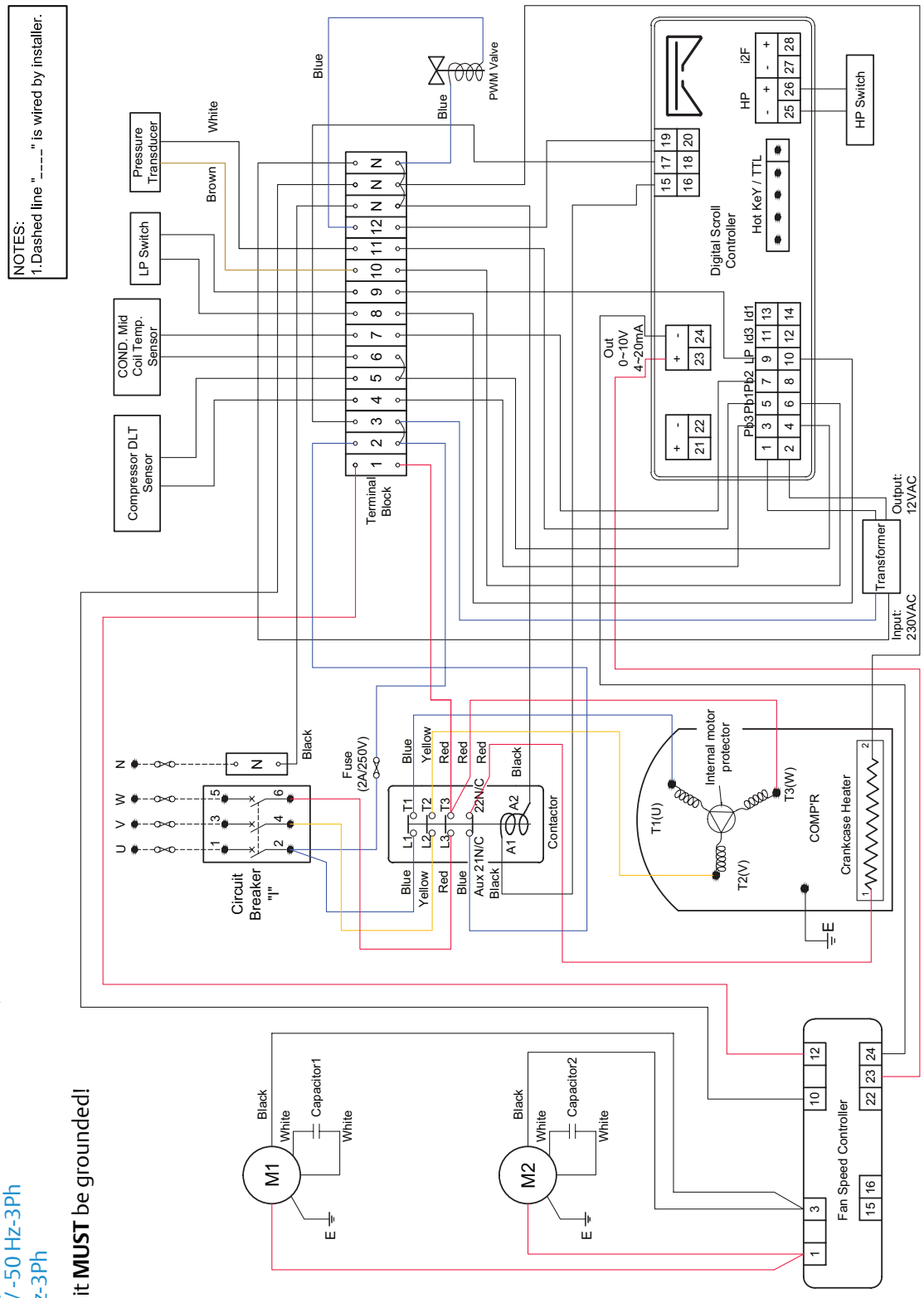
ZXD Condensing Unit Wiring Diagram

(With Fan Speed Control Function)

TFD: 380V/420V-50 Hz-3Ph

TF7: 380V-60 Hz-3Ph

ATTENTION: Unit **MUST** be grounded!



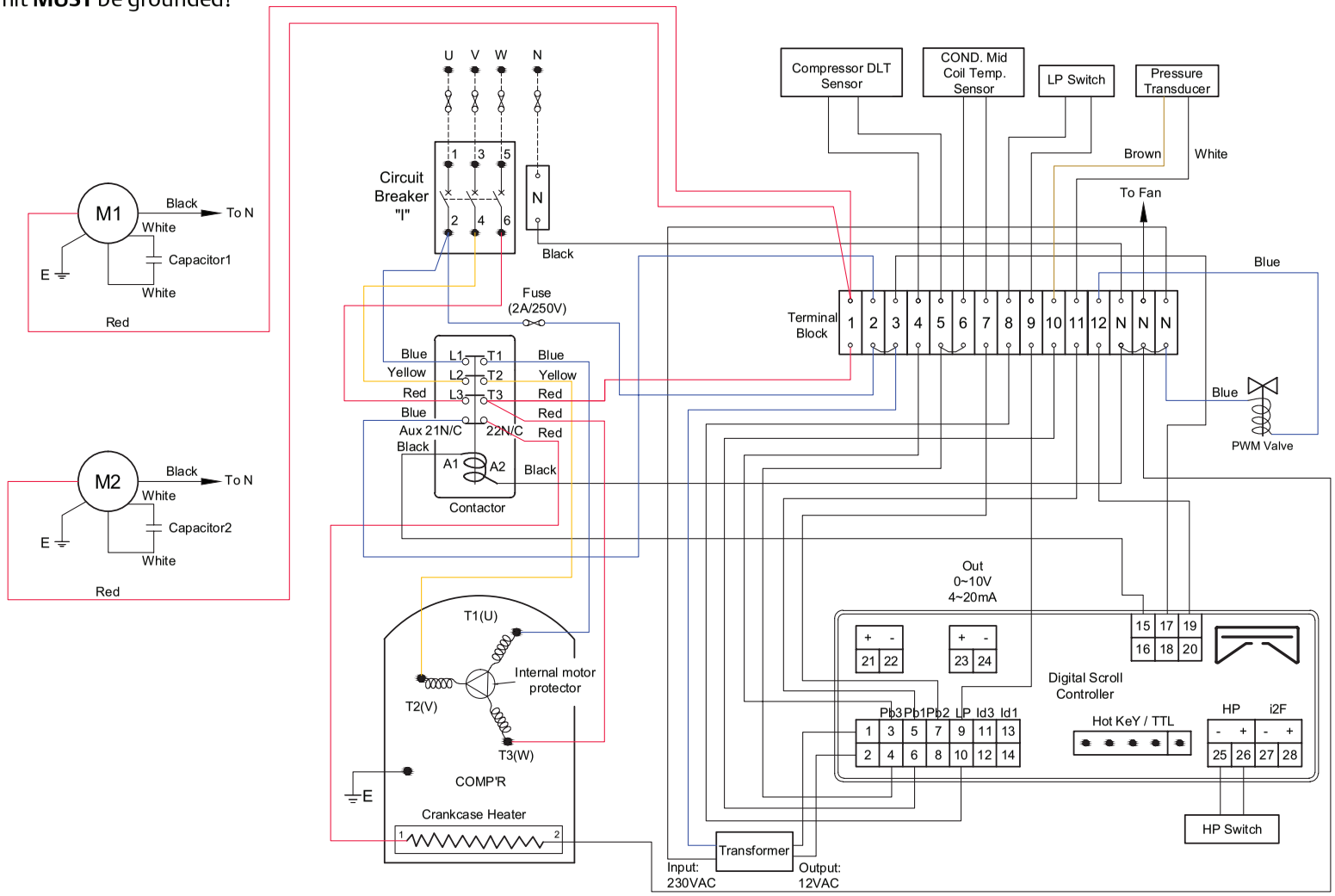
ZXD Condensing Unit Wiring Diagram

(without Fan Speed Control Function)

TFD: 380V/420V-50 Hz-3Ph
TF7: 380V- 60 Hz-3Ph

ATTENTION: Unit **MUST** be grounded!

NOTES:
1.Dashed line "____" is wired by installer.



Packing Information

Container Loading, ZX Platform Condensing Unit					
Family	**Model**	**Motor Code**	**Fan Type**	**20FT**	**40FT/ 40FT H**
ZX	ZX0200/E	PFJ/TFD/TF5/TF7	Single Fan	40	80
	ZX0250/E	PFJ		40	80
	ZX0300/E	PFJ/TFD/TF5/TF7		40	80
	ZX0400/E	PFJ/TFD		40	80
	ZX0400/E	TF5/TF7	Dual Fan	20	40
	ZX0500/E	TFD/TF5/TF7		20	40
	ZX0600/E	TFD/TF5/TF7		20	40
	ZX0750/E	TFD/TF5/TF7		20	40
ZXD	ZX0750/E	TFD/TF7	Dual Fan	20	40
	ZXD0500/E	TFD/TF7		20	40
	ZXD0600/E	TFD/TF7		20	40
	ZXD0750/E	TFD/TF7		20	40
ZXL	ZXL0200/E	TFD/TF5/TF7	Single Fan	40	80
	ZXL0250/E	TFD/TF5/TF7		40	80
	ZXL0300/E	TFD/TF5/TF7		40	80
	ZXL0350/E	TFD/TF5/TF7		40	80
	ZXL0400/E	TFD		40	80
	ZXL0400/E	TF5/TF7	Dual Fan	20	40
	ZXL0500/E	TFD/TF5/TF7		20	40
	ZXL0600/E	TFD/TF5/TF7		20	40
	ZXL0750/E	TFD/TF5/TF7		20	40

Conversion Chart

Units Conversion Chart
KCALH x 3.9683 = BTUH
WATTS x 3.413 = BTU/H
1.80 x ^{O}C + 32 = ^{O}F
KILOGRAMS x 2.205 = POUNDS
MILLIMETERS x 0.0394 = INCHES
CUBIC CENTIMETERS x 0.06102 = CUBIC INCHES
CUBIC METERS x 35.3147 = CUBIC FEET
LITERS x 33.8181 = FLUID OUNCES
KILOWATTS x 1.341 = HORSEPOWER
BAR x 14.7 = PSI

PRESSURE TEMPERATURE CHART AT SEA LEVEL

Red (Bar)=Vacuum Black (Bar)=Vapor **Bold (Bar)=Liquid**

°C	R12	R22	R-134a	R407A Vapor	R407A Liquid	R404A HP 62	R407C Vapor	R407C Liquid	R408A	R409A	R410A	R502	R507A AZ50"	°F
-45.6	0.53	0.21	0.63	0.30	0.03	0.00	0.37	0.09	0.07	0.63	0.34	-0.03	0.06	-50.0
-44.4	0.49	0.16	0.61	0.26	0.03	0.05	0.33	0.04	0.02	0.61	0.41	0.02	0.12	-48.0
-43.3	0.47	0.12	0.59	0.22	0.08	0.11	0.29	0.01	0.04	0.58	0.48	0.08	0.18	-46.0
-42.2	0.44	0.06	0.56	0.17	0.14	0.17	0.25	0.07	0.10	0.56	0.57	0.14	0.24	-44.0
-41.1	0.41	0.01	0.53	0.12	0.21	0.23	0.20	0.13	0.15	0.53	0.65	0.19	0.30	-42.0
-40.0	0.37	0.04	0.50	0.07	0.27	0.30	0.16	0.19	0.21	0.50	0.74	0.26	0.37	-40.0
-38.9	0.34	0.10	0.47	0.01	0.34	0.37	0.11	0.26	0.28	0.47	0.83	0.32	0.44	-38.0
-37.8	0.30	0.15	0.44	0.04	0.41	0.43	0.06	0.32	0.34	0.44	0.92	0.39	0.52	-36.0
-36.7	0.27	0.21	0.41	0.10	0.48	0.51	0.00	0.39	0.41	0.41	1.01	0.46	0.59	-34.0
-35.6	0.23	0.28	0.37	0.16	0.56	0.59	0.06	0.46	0.48	0.37	1.12	0.53	0.68	-32.0
-34.4	0.19	0.34	0.33	0.23	0.63	0.66	0.11	0.53	0.55	0.34	1.22	0.60	0.75	-30.0
-33.3	0.15	0.41	0.29	0.29	0.72	0.74	0.17	0.61	0.63	0.30	1.33	0.68	0.84	-28.0
-32.2	0.10	0.48	0.25	0.36	0.80	0.83	0.23	0.69	0.71	0.26	1.44	0.76	0.93	-26.0
-31.1	0.06	0.55	0.21	0.43	0.89	0.92	0.30	0.77	0.79	0.22	1.56	0.84	1.02	-24.0
-30.0	0.01	0.63	0.17	0.51	0.98	1.01	0.37	0.86	0.88	0.17	1.68	0.93	1.12	-22.0
-28.9	0.03	0.70	0.13	0.59	1.08	1.10	0.45	0.94	0.97	0.13	1.81	1.01	1.21	-20.0
-27.8	0.09	0.79	0.08	0.67	1.17	1.20	0.52	1.04	1.06	0.08	1.94	1.11	1.32	-18.0
-26.7	0.14	0.87	0.03	0.75	1.28	1.30	0.60	1.14	1.15	0.03	2.07	1.20	1.42	-16.0
-25.6	0.19	0.96	0.02	0.84	1.38	1.41	0.68	1.23	1.25	0.02	2.21	1.30	1.53	-14.0
-24.4	0.25	1.05	0.08	0.93	1.49	1.52	0.77	1.34	1.35	0.07	2.35	1.40	1.64	-12.0
-23.3	0.31	1.14	0.13	1.03	1.60	1.63	0.85	1.44	1.46	0.12	2.50	1.51	1.76	-10.0
-22.2	0.37	1.23	0.19	1.12	1.72	1.74	0.94	1.55	1.57	0.18	2.66	1.61	1.88	-8.0
-21.1	0.43	1.34	0.25	1.23	1.83	1.86	1.03	1.67	1.68	0.24	2.81	1.73	2.00	-6.0
-20.0	0.50	1.44	0.32	1.33	1.96	1.99	1.13	1.79	1.79	0.30	2.98	1.84	2.13	-4.0
-18.9	0.56	1.54	0.38	1.44	2.09	2.12	1.23	1.91	1.91	0.37	3.15	1.96	2.26	-2.0
-17.8	0.63	1.66	0.45	1.55	2.22	2.25	1.34	2.03	2.03	0.43	3.32	2.08	2.40	0.0
-16.7	0.70	1.77	0.52	1.67	2.36	2.39	1.45	2.17	2.16	0.50	3.50	2.21	2.54	2.0
-15.6	0.77	1.89	0.59	1.79	2.50	2.52	1.56	2.30	2.29	0.57	3.69	2.34	2.68	4.0
-14.4	0.85	2.01	0.66	1.92	2.65	2.67	1.68	2.43	2.43	0.65	3.88	2.48	2.83	6.0
-13.3	0.92	2.14	0.74	2.05	2.80	2.82	1.80	2.58	2.57	0.72	4.08	2.61	2.99	8.0
-12.2	1.01	2.26	0.82	2.18	2.95	2.97	1.92	2.72	2.71	0.80	4.29	2.76	3.15	10.0
-11.1	1.09	2.40	0.90	2.32	3.11	3.13	2.05	2.88	2.86	0.88	4.50	2.90	3.31	12.0
-10.0	1.17	2.54	0.99	2.46	3.28	3.30	2.19	3.03	3.01	0.97	4.72	3.06	3.48	14.0
-8.9	1.26	2.68	1.08	2.61	3.45	3.46	2.32	3.19	3.17	1.06	4.94	3.21	3.66	16.0
-7.8	1.35	2.82	1.17	2.76	3.62	3.63	2.46	3.36	3.32	1.14	5.17	3.37	3.83	18.0
-6.7	1.45	2.97	1.27	2.92	3.80	3.81	2.61	3.53	3.49	1.24	5.41	3.53	4.01	20.0
-5.6	1.54	3.12	1.37	3.08	3.99	4.00	2.77	3.71	3.66	1.34	5.65	3.70	4.21	22.0
-4.4	1.64	3.28	1.47	3.25	4.18	4.19	2.92	3.89	3.84	1.43	5.90	3.88	4.40	24.0
-3.3	1.74	3.45	1.58	3.42	4.37	4.38	3.08	4.08	4.02	1.54	6.15	4.06	4.60	26.0
-2.2	1.85	3.61	1.69	3.60	4.57	4.58	3.25	4.27	4.21	1.65	6.42	4.23	4.80	28.0
-1.1	1.96	3.79	1.80	3.78	4.78	4.78	3.42	4.46	4.39	1.76	6.69	4.43	5.01	30.0
0.0	2.07	3.97	1.92	3.97	4.99	4.99	3.59	4.67	4.59	1.87	6.97	4.62	5.23	32.0
1.1	2.18	4.15	2.03	4.17	5.21	5.21	3.78	4.88	4.79	1.99	7.26	4.81	5.45	34.0
2.2	2.30	4.34	2.16	4.37	5.43	5.43	3.97	5.09	5.00	2.10	7.55	5.02	5.68	36.0
3.3	2.42	4.53	2.28	4.57	5.67	5.66	4.16	5.31	5.21	2.23	7.86	5.23	5.91	38.0
4.4	2.54	4.73	2.41	4.79	5.90	5.89	4.36	5.53	5.43	2.36	8.17	5.44	6.15	40.0
5.6	2.67	4.93	2.55	5.00	6.14	6.12	4.56	5.77	5.65	2.49	8.48	5.66	6.39	42.0
6.7	2.80	5.14	2.69	5.23	6.40	6.37	4.77	6.00	5.88	2.62	8.81	5.89	6.65	44.0
7.8	2.94	5.35	2.83	5.46	6.66	6.62	4.99	6.25	6.12	2.77	9.14	6.12	6.90	46.0
8.9	3.08	5.57	2.98	5.70	6.92	6.88	5.21	6.50	6.36	2.90	9.48	6.35	7.17	48.0

PRESSURE TEMPERATURE CHART AT SEA LEVEL

Red (Bar)=Vacuum Black (Bar)=Vapor **Bold (Bar)=Liquid**

°C	R12	R22	R-134a	R407A Vapor	R407A Liquid	R404A HP 62	R407C Vapor	R407C Liquid	R408A	R409A	R410A	R502	R507A AZ50"	°F
10.0	3.21	5.80	3.13	5.94	7.19	7.14	5.43	6.75	6.60	3.06	9.83	6.59	7.44	50.0
11.1	3.36	6.03	3.29	6.19	**7.46**	**7.41**	5.67	**7.01**	6.86	**3.21**	10.20	6.84	7.72	52.0
12.2	3.50	6.26	3.45	6.44	**7.74**	**7.70**	5.91	**7.28**	7.11	**3.36**	10.57	7.10	8.01	54.0
13.3	3.66	6.51	3.61	6.71	**8.03**	**7.98**	6.16	**7.56**	7.38	**3.52**	10.94	7.35	8.30	56.0
14.4	3.81	6.76	3.79	6.98	**8.33**	**8.27**	6.41	**7.84**	7.65	**3.68**	11.34	7.62	8.59	58.0
15.6	3.97	7.01	3.96	7.26	**8.63**	**8.57**	6.68	**8.13**	7.93	**3.86**	11.73	7.89	8.90	60.0
16.7	4.14	7.27	4.14	7.54	**8.94**	**8.88**	6.94	**8.43**	8.21	**4.03**	12.14	8.17	9.21	62.0
17.8	4.30	7.54	4.32	7.83	**9.26**	**9.19**	7.22	**8.74**	8.50	**4.21**	12.56	8.46	9.54	64.0
18.9	4.48	7.81	4.51	8.13	**9.59**	**9.50**	7.50	**9.05**	8.80	**4.39**	12.99	8.74	9.86	66.0
20.0	4.66	8.09	4.70	8.44	**9.92**	**9.83**	7.79	**9.37**	9.10	**4.58**	13.42	9.04	10.20	68.0
21.1	4.83	8.37	4.90	8.76	**10.26**	**10.17**	8.09	**9.69**	9.42	**4.77**	13.87	9.34	10.54	70.0
22.2	5.01	8.67	5.11	9.08	**10.61**	**10.51**	8.39	**10.03**	9.74	**4.97**	14.32	9.66	10.89	72.0
23.3	5.20	8.97	5.32	9.41	**10.97**	**10.86**	8.70	**10.37**	10.06	**5.17**	14.79	9.98	11.25	74.0
24.4	5.39	9.28	5.53	9.75	**11.34**	**11.22**	9.03	**10.72**	10.40	**5.38**	15.27	10.30	11.62	76.0
25.6	5.59	9.59	5.75	10.10	**11.71**	**11.59**	9.35	**11.07**	10.74	**5.59**	15.76	10.63	11.99	78.0
26.7	5.79	9.90	5.98	10.46	**12.09**	**11.96**	9.69	**11.43**	11.09	**5.81**	16.26	10.97	12.38	80.0
27.8	6.00	10.23	6.21	10.82	**12.48**	**12.34**	10.03	**11.81**	11.44	**6.03**	16.77	11.32	12.77	82.0
28.9	6.21	10.57	6.45	11.19	**12.88**	**12.73**	10.39	**12.19**	11.81	**6.26**	17.29	11.67	13.17	84.0
30.0	6.43	10.91	6.69	11.57	**13.28**	**13.13**	10.75	**12.58**	12.18	**6.50**	17.83	12.03	13.58	86.0
31.1	6.64	11.26	6.94	11.97	**13.70**	**13.54**	11.12	**12.98**	12.56	**6.74**	18.37	12.40	13.99	88.0
32.2	6.87	11.61	7.19	12.37	**14.12**	**13.96**	11.50	**13.39**	12.94	**6.99**	18.93	12.78	14.42	90.0
33.3	7.10	11.98	7.46	12.78	**14.56**	**14.39**	11.88	**13.80**	13.34	**7.23**	19.50	13.16	14.86	92.0
34.4	7.33	12.35	7.72	13.20	**15.01**	**14.82**	12.28	**14.23**	13.74	**7.50**	20.08	13.55	15.30	94.0
35.6	7.57	12.73	7.99	13.63	**15.46**	**15.26**	12.69	**14.66**	14.16	**7.76**	20.68	13.95	15.76	96.0
36.7	7.81	13.12	8.28	14.06	**15.92**	**15.72**	13.10	**15.10**	14.58	**8.03**	21.28	14.36	16.22	98.0
37.8	8.06	13.51	8.57	14.51	**16.39**	**16.18**	13.52	**15.55**	15.01	**8.30**	21.90	14.78	16.70	100.0
38.9	8.32	13.92	8.86	14.97	**16.87**	**16.66**	13.96	**16.01**	15.45	**8.59**	22.53	15.20	17.18	102.0
40.0	8.58	14.32	9.15	15.44	**17.36**	**17.14**	14.41	**16.48**	15.90	**8.88**	23.18	15.63	17.67	104.0
41.1	8.84	14.74	9.46	15.92	**17.86**	**17.63**	14.86	**16.96**	16.35	**9.17**	23.84	16.08	18.17	106.0
42.2	9.11	15.17	9.77	16.41	**18.37**	**18.13**	15.32	**17.45**	16.82	**9.47**	24.51	16.52	18.69	108.0
43.3	9.39	15.61	10.10	16.91	**18.89**	**18.65**	15.79	**17.95**	17.29	**9.78**	25.20	16.99	19.21	110.0
44.4	9.67	16.06	10.42	17.43	**19.42**	**19.17**	16.28	**18.46**	17.78	**10.10**	25.90	17.45	19.74	112.0
45.6	9.95	16.51	10.76	17.94	**19.97**	**19.70**	16.78	**18.97**	18.27	**10.42**	26.61	17.93	20.29	114.0
46.7	10.25	16.97	11.10	18.48	**20.52**	**20.25**	17.28	**19.50**	18.77	**10.74**	27.34	18.41	20.85	116.0
47.8	10.54	17.45	11.45	19.03	**21.08**	**20.81**	17.80	**20.04**	19.29	**11.08**	28.09	18.91	21.41	118.0
48.9	10.85	17.93	11.81	19.59	**21.66**	**21.37**	18.33	**20.59**	19.81	**11.43**	28.85	19.41	21.99	120.0
50.0	11.16	18.42	12.17	20.16	**22.23**	**21.95**	18.87	**21.15**	20.34	**11.78**	29.62	19.92	22.59	122.0
51.1	11.47	18.92	12.54	20.74	**22.83**	**22.54**	19.42	**21.72**	20.89	**12.14**	30.41	20.45	23.19	124.0
52.2	11.79	19.43	12.92	21.33	**23.44**	**23.14**	19.99	**22.30**	21.44	**12.50**	31.22	20.99	23.80	126.0
53.3	12.12	19.94	13.31	21.94	**24.06**	**23.75**	20.56	**22.90**	22.01	**12.88**	32.04	21.52	24.43	128.0
54.4	12.45	20.48	13.70	22.56	**24.68**	**24.38**	21.14	**23.50**	22.58	**13.26**	32.88	22.08	25.07	130.0
55.6	12.79	21.01	14.11	23.19	**25.32**	**25.02**	21.75	**24.12**	23.17	**13.64**	33.74	22.65	25.72	132.0
56.7	13.14	21.56	14.52	23.84	**25.98**	**25.67**	22.36	**24.74**	23.77	**14.04**	34.61	23.22	26.39	134.0
57.8	13.49	22.12	14.94	24.50	**26.64**	**26.34**	22.99	**25.38**	24.37	**14.44**	35.50	23.81	27.06	136.0
58.9	13.85	22.69	15.37	25.18	**27.32**	**27.01**	23.63	**26.03**	24.99	**14.86**	36.41	24.40	27.75	138.0
60.0	14.21	23.27	15.81	25.87	**28.01**	**27.70**	24.28	**26.69**	25.62	**15.28**	37.34	25.01	28.46	140.0
61.1	14.58	23.86	16.26	26.57	**28.71**	**28.41**	24.94	**27.36**	26.27	**15.70**	38.29	25.62	29.18	142.0
62.2	14.96	24.46	16.71	27.29	**29.43**	**29.13**	25.63	**28.04**	26.92	**16.14**	39.26	26.26	29.92	144.0
63.3	15.34	25.07	17.17	28.02	**30.15**	**29.87**	26.32	**28.74**	27.59	**16.59**	40.24	26.90	30.67	146.0
64.4	15.73	25.69	17.65	28.77	**30.90**	**30.61**	27.03	**29.45**	28.27	**17.05**	41.25	27.54	31.43	148.0
65.6	16.13	26.32	18.13	29.54	**31.65**	**31.39**	27.76	**30.17**	28.96	**17.51**	42.28	28.21	32.22	150.0

Contact Lists

Emerson Climate Technologies
Asia Pacific Headquarters
10/F, Pioneer Building,
213 Wai Yip Street,
Kwun Tong, Kowloon, Hong Kong
Tel: (852) 2866 3108
Fax: (852) 2520 6227

Australia
Emerson Climate Technologies Australia Pty Ltd
Unit R7, 391 Park Road
Regents Park, NSW 2143, Australia
Tel: (61-2) 9795 2800
Fax: (61-2) 9738 1699

China - Beijing
Emerson Climate Technologies (Suzhou) Co. Ltd
Beijing Sales Office
Room 1017, Canway Building
66 Nan Lishi Road, Xicheng District
Beijing 100045, China
Tel: (86-10) 5763 0488
Fax: (86-10) 5763 0499

China - Guangzhou
Emerson Climate Technologies (Suzhou) Co. Ltd
Guangzhou Sales Office
Room 508-509, R&F Yinglong Plaza
No. 76 Huangpu Road West,
Guangzhou 510623, PRC.
Tel: (86-20) 2886 7668
Fax: (86-20) 2886 7622

China - Shanghai
Emerson Climate Technologies (Suzhou) Co. Ltd
Shanghai Sales Office
Room 1801, Building B,
New Caohejing International Business Center,
Shanghai 200233, China
Tel: (86-21) 34183999
Fax: (86-21) 34183988

India - PUNE
Emerson Climate Technologies Ltd
India Head Office
Plot No. 23, Rajiv Gandhi Infotech Park,
Phase - II, Hinjewadi,
Pune 411 057, Maharashtra, India
Tel: (91-20) 2553 4988
Fax: (91-20) 2553 6350

Indonesia
PT Emerson Indonesia
Wisma 46 - Kota BNI, 16th Floor, Suite 16.01 ,
Jl. Jend.Sudirman Kav.1.
Jakarta 10220
INDONESIA
Tel: (62)21-2513003 ext.6000
Fax: (62)21-2510622

Japan
Emerson Japan Ltd
Shin-yokohama Tosho Building No. 3
3-9-5 Shin-Yokohama, Kohoku-ku
Yokohama 222-0033 Japan
Tel: (81-45)475 6371
Fax: (81-45)475 3565

South Korea
Emerson Electric (South Korea) Ltd
3F Pharos Tower, 119 Nonhyeon-dong
Gangnam-gu, Seoul, South Korea 135-010
Tel: (82-2) 3483-1500
Fax: (82-2) 592-7883 / 592-7886

Malaysia
Emerson Electric (Malaysia) Sdn. Bhd.
Level M2, Blk A, Menara PKNS-PJ
Jalan Yong Shook Lin
46050 Petaling Jaya, Selangor, Malaysia
Tel: (60-3) 7949 9222
Fax: (60-3) 7949 9333

Middle East & Africa
Emerson Climate Technologies
PO Box 26382
Jebel Ali Free Zone – South
Dubai, UAE
Tel: (971- 4) 811 8100
Fax: (971- 4) 886 5465

Philippines
Emerson Climate Technologies
23rd Floor San Miguel Properties Centre
#7 St. Francis Street, Ortigas Center,
Mandaluyong City, Philippines
Tel: (632) 689 7288 / (632) 479 5200

Taiwan
Emerson Electric (Taiwan) Co. Ltd
3rd Floor, Dunhua South Road
Section 1, Taipei 10650, Taiwan, R.O.C.
Tel: (+886-2) 8161 7688
Fax: (+886-2) 2702 9630

Thailand - Bangkok
Emerson Electric (Thailand) Ltd
34th Floor Nation Tower
1858/133 Bangna Trad
Bangkok 10260 , Thailand
Tel: (66-2) 716 4700
Fax: (66-2) 751 4240

Vietnam
Emerson Climate Technologies - Vietnam
Suite 307-308,
123 Truong Dinh St., Dist.3 Ho Chi Minh,
Vietnam
Tel: 84 908 009 189

EmersonClimate.com/Asia

Asia 02 A0104 – R00 Issued 5/2012
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